FIVE PLACE

LOGARITHMIC TABLES

TOGETHER WITH A

FOUR PLACE TABLE OF NATURAL FUNCTIONS

ARRANGED BY

C. H. ASHTON

AND

W. R. MARSH

NEW YORK
CHARLES SCRIBNER'S SONS
1902

PREFACE

THE following tables have been arranged to meet three requirements: first, accuracy; second, a small page; third, legibility. The tables have all been so carefully compared with those of Gauss and of Vega that it is believed no errors exist. The size of the page, and the arrangement of the logarithms in blocks of three, aid the reader to select quickly and accurately the proper logarithm.

AUGUST, 1902.

INTRODUCTION

1. DEFINITIONS

The logarithm of any number is the exponent indicating the power to which a certain fixed number, called the base, must be raised in order to produce the given number.

In the **Common** (or **Briggs**) **System,** the number **10** is always taken as the **base.** It may be shown that —

$10^0 = 1$,	$10^0 = 1$,
$10^1 = 10$,	$10^{-1} = \frac{1}{10} = 0.1$,
$10^2 = 100$,	$10^{-2} = \frac{1}{10^2} = 0.01$,
$10^3 = 1000$,	$10^{-3} = \frac{1}{10^3} = 0.001$,
$10^4 = 10000$,	$10^{-4} = \frac{1}{10^4} = 0.0001$,
$10^5 = 100000$,	$10^{-5} = \frac{1}{10^5} = 0.00001$,
$10^6 = 1000000$.	$10^{-6} = \frac{1}{10^6} = 0.000001$.

Log $1 = 0$, is a short way of writing that, in the system in which the base is 10, the exponent of the power of 10, which produces 1, is 0.

From the above table we have:

log 1 $= 0$,	log 1 $= 0$,
log 10 $= 1$,	log .1 $= -1$,
log 100 $= 2$,	log .01 $= -2$,
log 1000 $= 3$,	log .001 $= -3$,
log 10000 $= 4$.	log .0001 $= -4$.

It is evident that a number between 1 and 10 has a logarithm between 0 and 1; a number between 10 and 100 has a logarithm between 1 and 2; a number between 100 and 1000 has a logarithm between 2 and 3; a number between 1000 and 10,000 has a logarithm between 3 and 4; a number between 1 and .1 has a logarithm between 0 and −1; a number between .1 and .01 has a logarithm between −1 and −2; a number between .01 and .001 has a logarithm between −2 and −3, etc. Every positive real number may be (either exactly or approximately) expressed as a power of 10.

From the table given above, it is evident that the logarithm of a number greater than 1 is positive, and that the logarithm of a number less than 1 is negative.

2. THE CHARACTERISTIC AND MANTISSA

The logarithm of a number, not an exact power of 10, consists of two parts, — the **characteristic**, which is the integral part, and the **mantissa**, which is the fractional part, the latter being expressed as a decimal.

The characteristic of the logarithm of any number greater than 1 is always positive, and depends upon the number of significant digits in that number to the left of the decimal point. From the table it may be seen that any number containing two digits to the left of the decimal point has a characteristic of 1; that any number containing three digits to the left of the decimal point has a characteristic of 2; that any number containing four digits to the left of the decimal point has a characteristic of 3; and so on. Hence, to find the characteristic of the logarithm of any number greater than 1, we have the following rule:

The characteristic of the logarithm of any number greater than 1 is always one less than the number of digits preceding the decimal point.

The mantissa of the logarithm of any number greater than 1 is always given in the table.

The characteristic of the logarithm of any number less than 1 is always negative, and depends upon the number of zeros between the decimal point and the first significant digit. From the table it may be seen that any number less than 1 and containing no zeros between the decimal point and the first significant digit is -1; that any number containing one zero between the decimal point and the first significant digit is -2; that any number containing two zeros between the decimal point and the first significant digit is -3; and so on. The characteristic of the logarithm of a number less than 1 is rarely written in a negative form, but thus:

-1 is written $9 (+\text{decimal}) - 10$;

-2 is written $8 (+\text{decimal}) - 10$;

-3 is written $7 (+\text{decimal}) - 10$.

A further examination of the table will show that the logarithm of a number less than 1 will have a characteristic, which is the difference between 9 and the number of zeros between the decimal point and the first significant digit, minus 10. Hence, we have the following rule:

The characteristic of the logarithm of any number less than 1 is negative, and is the difference between 9 and the number of zeros between the decimal point and the first significant digit, writing -10 after the mantissa.

The mantissa of the logarithm of any number less than 1 is always given in the table.

3. RULES FOR THE USE OF LOGARITHMS

Since all positive real numbers may be approximately expressed as powers of 10, we have the following rules:

TO MULTIPLY NUMBERS

(1) *The logarithm of the product of two or more numbers is the sum of the logarithms of the factors.*

TO DIVIDE NUMBERS

(2) *The logarithm of the quotient of two numbers is the logarithm of the dividend minus the logarithm of the divisor.*

TO RAISE A NUMBER TO A POWER

(3) *The logarithm of the power of a number is the product of the logarithm of the number by the exponent of the power.*

TO EXTRACT THE ROOT OF A NUMBER

(4) *The logarithm of the root of a number is the quotient obtained by dividing the logarithm of the number by the index of the root.*

Rules 1–4 may be expressed thus:

Rule 1. $10^a \cdot 10^b \cdot 10^c = 10^{a+b+c}$.

Rule 2. $10^a \div 10^b = 10^{a-b}$.

Rule 3. $(10^a)^b = 10^{ab}$.

Rule 4. $\sqrt[b]{10^a} = 10^{\frac{a}{b}}$.

For the proof of these rules, the student is referred to any good text-book in algebra.

It should always be remembered that logarithms in the Common System are simply exponents of 10, and that, therefore, logarithms conform to the laws of exponents.

The mantissas of the logarithms of all numbers which have the same sequence of digits is the same.

Given log 214.5 = 2.33143,

then log 2145 = log (214.5 × 10) = log 214.5 + log 10

= 2.33143 + 1 = 3.33143.

Given log 214.5 = 2.33143,

then   log .2145 = log (214.5 ÷ 1000)

$$= \log 214.5 - \log 1000$$

$$= 2.33143 - 3$$

$$= 9.33143 - 10.$$

Given log 214.5 = 2.33143,

then   log .002145 = log (214.5 ÷ 100,000)

$$= \log 214.5 - \log 100,000$$

$$= 2.33143 - 5$$

$$= 7.33143$$

4. TO FIND THE LOGARITHM OF ANY NUMBER CONSISTING OF FOUR DIGITS

Find in the column under N. the first three digits of the given number. The mantissa required will be at the intersection of the horizontal line containing the first three digits and the vertical column headed by the fourth digit. Prefix the proper characteristic.

For example :   log 21.73 = 1.33706,

log .4293 = 9.63276 − 10,

log 9702. = 3.98686,

log .0201 = 8.30320 − 10.

5. TO FIND THE LOGARITHM OF A NUMBER OF MORE THAN FOUR DIGITS

For example, find the logarithm of 92.013.

The mantissa of 9201 = .96384,

mantissa of 9202 = .96388.

The difference between the mantissa of 9202 and 9201 is

.96388 − .96384 = .00004.

It will be seen that a difference of 1 in the sequence, (9202 − 9201), produces a difference of .00004 in the mantissa. Now, in the number 92.013 (no attention being paid to the position of the decimal point, since the mantissa of all numbers having the same sequence of digits is the same) the last digit expresses .3 of the unit next before. Therefore, if a difference of 1 in the number produces a difference of .00004 in the mantissa, a difference of .3 will produce a difference of .3 of .00004 in the mantissa = .000012. Table I contains the mantissas to five places of decimals. Therefore, only .00001 is retained to add to .96384.

$$.96384$$
$$.00001$$
$$.96385 = \text{mantissa of log } 92.013.$$

Prefixing proper characteristic,

$$\log 92.013 = 1.96385.$$

Find the logarithm of 0.012301.

$$\log 1231 = .09026$$
$$\log 1230 = .08991$$
$$.00035$$

As shown, a difference of 35 (really .00035) in the mantissa is produced by a difference of 1 in the number. Therefore, .1 of 1 will produce a difference of .1 of 35 = 4 (really .00004) in the mantissa. Therefore, mantissa of 0.012301 = .08995. Prefixing proper characteristic,

$$\log 0.012301 = 8.08995 - 10.$$

The process of making the proper correction in the logarithms of numbers of more than four digits is called Interpolation. Interpolation may be shortened by using the table of proportional parts as given in the table. For

example, in the problem just discussed, a difference of .3 of 4 is given in the table as 1.2. In practice, if the table of proportional parts be used, interpolation may be performed mentally.

If a mantissa has a * prefixed, the first two digits will be found in the full mantissa written next after.

If the correction in the sixth decimal place be 5 or over, the fifth decimal place is increased by 1.

A dash written over 5 means that $\bar{5}$ stands between 4.5 and 5. In changing from a five to a four place table, the fourth digit in the mantissa is not increased by 1, if the last digit is $\bar{5}$.

NOTE. — Corrections are made on the hypothesis that adjacent mantissas increase proportionally with the corresponding numbers. Corrections made in this manner are not strictly accurate.

RULE. — *In Table I, find the mantissa of the first four significant digits, disregarding the position of the decimal point; subtract the mantissa thus found from the mantissa of the next higher number of four significant digits; multiply the difference thus found by the decimal represented by the remaining digits of the given number; add the product (to the fifth decimal) to the mantissa of the first four digits. Prefix the proper characteristic.*

6. TO FIND THE NUMBER CORRESPONDING TO A GIVEN LOGARITHM

Find the number whose logarithm is 2.68088. In accordance with Art. 2, we know that the characteristics of numbers are not given in Table I, but only the mantissas; and, in accordance with Art. 3, we know that the mantissas of the logarithms of all numbers which have the same sequence of digits is the same. Therefore, look up the mantissa .68088 in the table. The sequence of digits which have this mantissa is 4796. If this

sequence represented a whole number, the characteristic would be 3; but since the characteristic is 2, there must be 3 digits to the left of the decimal point. Therefore, the number corresponding to the logarithm 2.68088 is 479.6.

Find the number corresponding to the logarithm 1.24034. There is no mantissa 24034 in the table. But mantissa 24030 corresponds to the sequence 1739, while mantissa 24055̄ corresponds to the sequence 1740. The difference in the sequence of the digits is 1, (= 1740 − 1739); the difference in the mantissa is 25, (= 24055 − 24030). That is, a difference of 25 in the mantissa produces a difference of 1 in the sequence; a difference of 4, (= 24034 − 24030), will produce a difference of $\frac{4}{25}$ of 1 in the sequence. $\frac{4}{25}$ = .16, which is nearer .2 than .1. The mantissa corresponds to the sequence 17392. The given characteristic in 1.24034 shows that two digits lie to the left of the decimal point. Therefore,

$$\log 17.392 = 1.24034.$$

Find the number corresponding to the logarithm 7.92015 − 10.

If mantissa is 92018, the sequence is 8321; if mantissa is 92012, the sequence is 8320; a difference of 6 in the mantissa produces a difference of 1 in the sequence. The mantissa 92015 is 3 greater than mantissa 92012. Then,

$$\frac{\text{a difference of 6 in mantissa}}{\text{a difference of 3 in mantissa}} = \frac{\text{a difference of 1 in sequence}}{\text{a difference of } x \text{ in sequence}}$$

$6x = 3$; $x = .5$. Therefore, sequence 83205 has the mantissa 92015. Since the characteristic is negative, there must be as many zeros between the decimal point and the first significant digit as $9 − 7 = 2$. Therefore,

$$\log .0083205 = 7.92015 − 10.$$

RULES FOR POINTING OFF THE NUMBER CORRESPONDING TO A GIVEN LOGARITHM

(1) *If the logarithm is positive, point off from the left of the number one more digit than is expressed by the characteristic.*

(2) *If the logarithm is negative, there will be as many zeros between the decimal point and the first significant digit as 9 exceeds the characteristic.*

EXERCISE I

Find the logarithm of —

1. 254.	**8.** 4.65.	**15.** 26.001.
2. 908.	**9.** 0.0324.	**16.** 0.21415.
3. 3624.	**10.** 26.59.	**17.** 4.0000.
4. 1001.	**11.** 0.9254.	**18.** 0.00007.
5. 8437.	**12.** 0.0001243.	**19.** 0.082536.
6. 26.2.	**13.** 52847.	**20.** 5287.9.
7. 0.362.	**14.** 92.659.	

Find the number corresponding to the following logarithms:

21. 2.43136.	**33.** 7.62541.	**45.** 3.65278.
22. 1.30103.	**34.** 4.12000.	**46.** 1.45312.
23. 2.69897.	**35.** 6.15141−10.	**47.** 3.14159.
24. 6.90507.	**36.** 4.62953.	**48.** 6.23456.
25. 2.98250.	**37.** 7.99085−10.	**49.** 0.85734.
26. 0.85394.	**38.** 5.60101.	**50.** 0.00102.
27. 9.77880−10.	**39.** 0.56437.	**51.** 9.64572.
28. 7.62992−10.	**40.** 1.45273.	**52.** 0.52317.
29. 5.32222−10.	**41.** 9.62666−10.	**53.** 9.01012−10.
30. 8.83104−10.	**42.** 8.77002−10.	**54.** 9.64257−10.
31. 0.84491.	**43.** 6.84432.	**55.** 8.88888−10.
32. 9.62541−10.	**44.** 6.54013−10.	**56.** 7.84519−10.

7. USE OF LOGARITHMS WHICH HAVE NEGATIVE CHARACTERISTICS

In finding the number corresponding to a negative logarithm, — 10 should always appear at the end of the logarithm.

For example, add the following logarithms :

$$9.62541 - 10$$
$$8.51473 - 10$$
$$\overline{18.14014 - 20} = 8.14014 - 10.$$

In subtracting logarithms, where a larger is to be taken from a lesser logarithm, or in subtracting a negative from a positive logarithm, arrange the work in such a form that the characteristic of the minuend shall be greater than the characteristic of the subtrahend. For example, subtract the following logarithms :

$$2.14537 = 12.14537 - 10$$
$$3.14797 = \ \ 3.14797$$
$$\overline{ 8.99740 - 10.}$$

$$8.41537 - 10 = 18.41537 - 20$$
$$9.31453 - 10 = \ \ 9.31453 - 10$$
$$= \overline{\ \ 9.10084 - 10.}$$

In multiplying a logarithm by an integer, make sure that the product is in its simplest form. For example, multiply the logarithm 9.14002 — 10 by 3.

$$9.14002 - 10$$
$$3$$
$$\overline{27.42006 - 30} = 7.42006 - 10.$$

In dividing a negative logarithm by an integer, put the logarithm in such a form that the quotient shall always have — 10 in the negative part.

For example, divide the logarithm 9.26153 − 10 by 2.

$$9.26153 - 10 = 19.26153 - 20,$$

$$\frac{2)19.26153 - 20}{9.63076 - 10.}$$

In multiplying a logarithm by a fraction, multiply the logarithm by the numerator and divide the product by the denominator in the order stated, taking care to simplify at each step.

For example, multiply the logarithm 8.26015−10 by $\frac{2}{3}$.

$$\frac{8.26015 - 10}{2}$$

$$16.52030 - 20 = 26.52030 - 30,$$

$$\frac{3)\log 26.52030 - 30}{\log \quad 8.84010 - 10.}$$

EXERCISE II

Perform the indicated operations in the following logarithms:

1. (9.73051 − 10) + (9.34572 − 10).

2. (8.54789 − 10) + (9.84375 − 10).

3. (0.65432) + (9.72534 − 10).

4. (0.87334) − (2.74590).

5. (9.34755) − (9.52444).

6. (8.23851 − 10) × 5.

7. (9.14352 − 10) ÷ 4.

8. (8.82999 − 10) ÷ 3.

9. (6.84325 − 10) × $\frac{2}{3}$.

10. (9.80101 − 10) ÷ $\frac{4}{5}$.

8. LOGARITHMIC COMPUTATIONS.

Ex. 1. $242.63 \times 0.042635 = ?$

$$\log 242.63 = 2.38494$$
$$\log 0.042635 = \underline{8.62977 - 10}$$
$$\log \text{product} = 1.01471,$$
$$\text{product} = 10.344.$$

Ex. 2. $920.03 \div 32.629 = ?$

$$\log 920.03 = 2.96381$$
$$\log 32.629 = \underline{1.51361}$$
$$\log \text{quotient} = 1.45020,$$
$$\text{quotient} = 28.196.$$

Ex. 3. $\dfrac{192.7 \times 6.5432 \times 0.4683}{1624.4 \times 0.03287 \times 1.028} = ?$

$$\log 192.7 = 2.28488$$
$$\log 6.5432 = 0.81579$$
$$\log 0.4683 = \underline{9.67052 - 10}$$
$$\log \text{numerator} = 2.77119.$$

$$\log 1624.4 = 3.21069$$
$$\log 0.03287 = 8.51680 - 10$$
$$\log 1.028 = \underline{0.01199}$$
$$\log \text{denominator} = 1.73948.$$

$$\log \text{numerator} = 2.77119$$
$$\log \text{denominator} = \underline{1.73948}$$
$$\log \text{result} = 1.03171,$$
$$\text{result} = 10.757.$$

Ex. 4. $\sqrt{(32.5)(68.7)(32.743)} = ?$

$$\log 32.5 = 1.51188$$
$$\log 68.7 = 1.83696$$
$$\log 32.743 = 1.51512$$
$$\log \text{ product} = 4.86396,$$
$$\tfrac{1}{2} \log \text{ product} = 2.43198,$$
$$\text{result} = 270.38.$$

Ex. 5. $(5.2348)^3 = ?$

$$\log 5.2348 = \quad 0.71890$$
$$3 \times \log 5.2348 = \quad 2.15670$$
$$(5.2348)^3 = 143.45.$$

Ex. 6. $0.7632 \times 62.83 + 8632 \times 3.265 = ?$

$$\log 0.7632 = \quad 9.88264 - 10 \qquad \log 8632 = 3.93611$$
$$\log 62.83 = \quad 1.79817 \qquad\qquad \log 3.265 = 0.51388$$
$$\log \text{ product} = \quad 1.68081, \qquad \log \text{ product} = 4.44999,$$
$$\text{product} = 47.952. \qquad\qquad \text{product} = 28183.$$

$$\cdot\ 47.952$$
$$28183.$$
$$\overline{28230.952}$$

NOTE. — The processes of addition and of subtraction cannot be performed by logarithms.

EXERCISE III

Perform the following computations, using logarithms as far as possible:

1. 0.0264×3245.1.
2. $86.457 \div 0.09878$.
3. $\sqrt[3]{144}$.
4. $\sqrt{2}$.
5. $(0.087652)^3$.
6. $76.24 \div 0.003947$.
7. 5.287×6285.4.
8. $781.03 \times \sqrt{0.08744}$.
9. $5628 \div 32.45 - 3268 \div 33.445$.
10. If $a = 39.7$, $b = 23.54$, $c = 44.82$, and $2s = a + b + c$, find value of $\sqrt{s(s-a)(s-b)(s-c)}$.

9. TABLE II, LOGARITHMIC FUNCTIONS

Table II contains the logarithms of the trigonometric functions of angles from 0° to 90°. For functions of angles from 0° to 45°, read down the page, and for functions of angles from 45° to 90°, read up the page, minutes being respectively at the left and right of the page.

Under d will be found the tabular differences of the sines, and, where the difference is sufficiently great, of the cosines; while under $c.d.$ will be found the common tabular differences of the tangents and cotangents.

The tabular differences of the functions of angles from 0° to 6° are so numerous that in each case under proportional parts will be found the tabular differences for each second.

Proportional parts, from 6° to 45°, are given in a different form. Seconds are given in the columns 6, 7, 8, 9, 10, 20, 30, 40, and 50. In the same line under the particular tabular difference will be found the proportional parts for the number of seconds required. If tenths of the proportional parts expressed by 10, 20, 30, 40, and 50 be taken, corrections will be found for 1, 2, 3, 4, and 5 seconds respectively. For example, the correction for 53″ may be found by adding the correction for 50″ and a tenth of the correction for 30″.

It may be shown[1] that *if an angle increases from 0° to 90°, the sine increases from 0 to 1, the cosine decreases from 1 to 0, the tangent increases from 0 to ∞, and the cotangent decreases from ∞ to 0.* Therefore, the logarithms of sines and cosines, as given in Table II, are all negative; and − 10 must be written after each logarithm. Tangents of angles from 0° to 45° are less than 1; therefore, − 10 must be written after logarithmic tangents of angles within these limits. Tangents of angles from 45° to 90°

[1] See Art. 18, Ashton and Marsh's Trigonometry.

are greater than 1; therefore, logarithmic tangents of angles within these limits are positive, as given in the table. Cotangents of angles from 45° to 90° are less than 1; therefore, logarithmic cotangents as given in the table are negative, and − 10 must be written after each logarithmic cotangent.

In interpolating for seconds, the correction should be **added** *in the case of the sine or tangent, and* **subtracted** *in the case of the cosine or cotangent.*

The above rule will be made easier if it be remembered that the sine and tangent of an angle increase as the angle itself increases, and that the cosine and cotangent of an angle decrease as the angle increases.

10. TO FIND THE LOGARITHM OF A FUNCTION OF AN ANGLE LESS THAN 90°

Find log cos 22° 37'. Reading the vertical column under log cos 22° until this column intersects the horizontal column from 37 at the left of the page, we find 9.96525̄. But, from Art. 9, − 10 must be written after log cos; therefore, log cos 20° 37' = 9.96525̄ − 10.

Find log tan 83° 54'. Reading the vertical column above log tan 83° until this column intersects the horizontal column from 54' at the right of the page, we find 0.97115̄. From Art. 9, log tan is positive.

Find log sin 4° 32' 25''. Reading the vertical column under log sin 4° until it intersects the horizontal column from 32' at the left of the page, we find, applying Art. 9, log sin 4° 32' = 8.89784 − 10. Under proportional parts, find the difference for 1'' for a tabular difference of 159, which is 2.65. For 25'', the difference will be 25 × 2.65 = 66.25. In accordance with Art. 9, add this difference; then, log sin 4° 32' 25'' = 8.89850 − 10.

Find log tan 71° 0′ 11″. Reading the vertical column above log tan 71° until it intersects the horizontal column from 0 at the right of the page, we find 0.46303. Between log tan 71° 0′ and 71° 1′ there is a tabular difference of 41. Under 41 find the proportional difference for 10 and for .1 of 10.

$$\text{difference for } 10' = 6.8$$
$$\text{``} \qquad \text{``} \quad 1' = .68$$
$$\text{``} \qquad \text{``} \quad 11' = \overline{7.48}$$

Adding this difference, log tan 71° 0′ 11″ = 0.46310.

Find the log cos 41° 24′ 16″. Reading the vertical column under log cos 41° until it intersects the horizontal column from 24′ at the left of the page, we find 9.87513. Under the tabular difference 12, find the proportional parts for 10″ and 6″, which are 2.0 and 1.2 respectively. 2.0 + 1.2 = 3.2. Subtracting the difference, we have log cos 41° 24′ 16″ = 9.87510 − 10.

11. TO FIND THE FUNCTIONS OF AN ANGLE GREATER THAN 90°

It may be proved[1] that the functions of any angle may be obtained in terms of the function of an angle less than, or equal to, 45°.

If 180° *or* 360° *is subtracted from a given angle, or if the given angle is subtracted from* 180° *or* 360° *(so as to obtain in either case an acute angle), the functions of the resulting angle will be numerically equal to the same named functions of the given angle; while if the given angle is combined in the same way with* 90° *or* 270°, *the functions of the resulting angle will be numerically equal to the co-named functions of the given angle.*

Attach to the result the proper sign of the function of the given angle, according to the quadrant in which it lies.

[1] See Art. 23, Ashton and Marsh's Trigonometry.

12. TO FIND THE ANGLE CORRESPONDING TO A LOGARITHMIC SINE, COSINE, TANGENT, OR COTANGENT

Find angle A, if log sin $A = 9.93301 - 10$. In Table II, find the mantissa of that log sin which is next below $9.93301 - 10$; in this case, $9.93299 - 10$, corresponding to the angle $58° 59'$. The difference between the mantissa .93299 and the next higher mantissa, .93307, is 8; the difference between the mantissa .93299 and the given mantissa, .93301, is 2. $\frac{2}{8}$ of $60'' = 15''$. Since the function is increasing, $15''$ must be added to $58° 59'$; therefore, angle $A = 58° 59' 15''$.

Find angle B, if log cos $B = 9.45756 - 10$. Find the mantissa of that log cos which is next below $9.45756 - 10$; in this case 9.45716, corresponding to the angle $73° 21'$. The difference between the mantissa .45716 and the next higher mantissa, .45758, is 42; the difference between the mantissa .45716 and the given mantissa, .45756, is 40. $\frac{40}{42}$ of $60'' = 57''$. Since the function is decreasing, $57''$ must be subtracted from $73° 21'$; therefore, angle $B = 73° 20' 3''$.

Find angle C, if log tan $C = 9.58995 - 10$. Find the mantissa of that log tan which is next below $9.58995 - 10$; in this case $9.58981 - 10$, corresponding to the angle $21° 15'$. The difference between the mantissa .58981 and the next higher mantissa, .59019, is 38; the difference between the mantissa .58981 and the given mantissa, .58995, is 14. $\frac{14}{38}$ of $60'' = 22''$. Since the function is increasing, $22''$ must be added to $21° 15'$; therefore, angle $C = 21° 15' 22''$.

Find angle D, if log cot $D = 0.04298$. Find the mantissa of that log cot which is next below .04298; in this case, .04277, corresponding to the angle $42° 11'$. The difference between the mantissa .04277 and the next higher mantissa, .04302, is 25; the difference between .04277, and the given mantissa, .04298, is 21. $\frac{21}{25}$ of $60'' = 50''$.

Since the function is decreasing, $50''$ must be subtracted from $42°\ 11'$; therefore, angle $D = 42°\ 10'\ 10''$.

EXERCISE IV

Find the logarithms of the following:

1. $\sin 24°\ 32'$.
2. $\tan 63°\ 27'$.
3. $\cos 11°\ 24'\ 50''$.
4. $\cot 62°\ 14'\ 52''$.
5. $\sin 112°\ 11'\ 13''$.
6. $\cos 92°\ 44'\ 50''$.
7. $\cot 148°\ 11'\ 23''$.
8. $\tan 69°\ 0'\ 27''$.
9. $\cos 44°\ 10'\ 24''$.
10. $\tan 62°\ 13'\ 20''$.
11. $\cot 163°\ 56'\ 29''$.
12. $\sin 51°\ 7'\ 31''$.

Find the angle A, if

13. $\log \tan A = 9.85700 - 10$.
14. $\log \cos A = 9.40300 - 10$.
15. $\log \sin A = 9.99985 - 10$.
16. $\log \cot A = 9.93130 - 10$.
17. $\log \cot A = 0.30107$.
18. $\log \tan A = 0.09682$.
19. $\log \sin A = 9.20697 - 10$.
20. $\log \tan A = 0.14807$.
21. $\log \cos A = 9.61555 - 10$.
22. $\log \tan A = 9.73300 - 10$.
23. $\log \cot A = 9.85118 - 10$.
24. $\log \cos A = 9.84196 - 10$.

13. TABLE III. NATURAL FUNCTIONS

In Table III, the actual numerical values of the sine, cosine, tangent, and cotangent are given to four places of decimals. For example, $\sin 45° = \frac{1}{2}\sqrt{2} = .7071$.

For functions of angles from $0°$ to $45°$, read down the page, degrees being given at the top and minutes at the left of the page. For functions of angles from $45°$ to $90°$, read up the page, degrees being given at the bottom, and minutes at the right, of the page. Functions of angles greater than $90°$ may be found in accordance with the rule given in Art. 11.

14. TABLE IV. LOGARITHMS OF CONSTANTS

Table IV contains the logarithms of a few constants merely for the sake of convenience.

TABLE V. SQUARES OF NATURAL NUMBERS

Table V contains the squares of all numbers between 1 and 1000. The first two digits of the number are found in the left-hand column, the third at the top of the page. The square will be found at the intersection of the proper row and column.

The square root to three places may be found at once by looking for the square which is nearest the given number; being careful to look for a square which has 5 digits, if the number contains an odd number of digits; while, if the number contains an even number of digits, the nearest square containing 6 digits must be found.

Two more places in the square root may be found by interpolation, if desired. For example, find $\sqrt{6635}$.

From the table $814^2 = 662596$

$815^2 = 664225$

The difference is 1629

$663500 - 662596 = \quad 904$

$904 \div 1629 = \quad .55$

Hence, $\sqrt{6635} = 81.455.$

The proper position of the decimal point may be found easily by inspection.
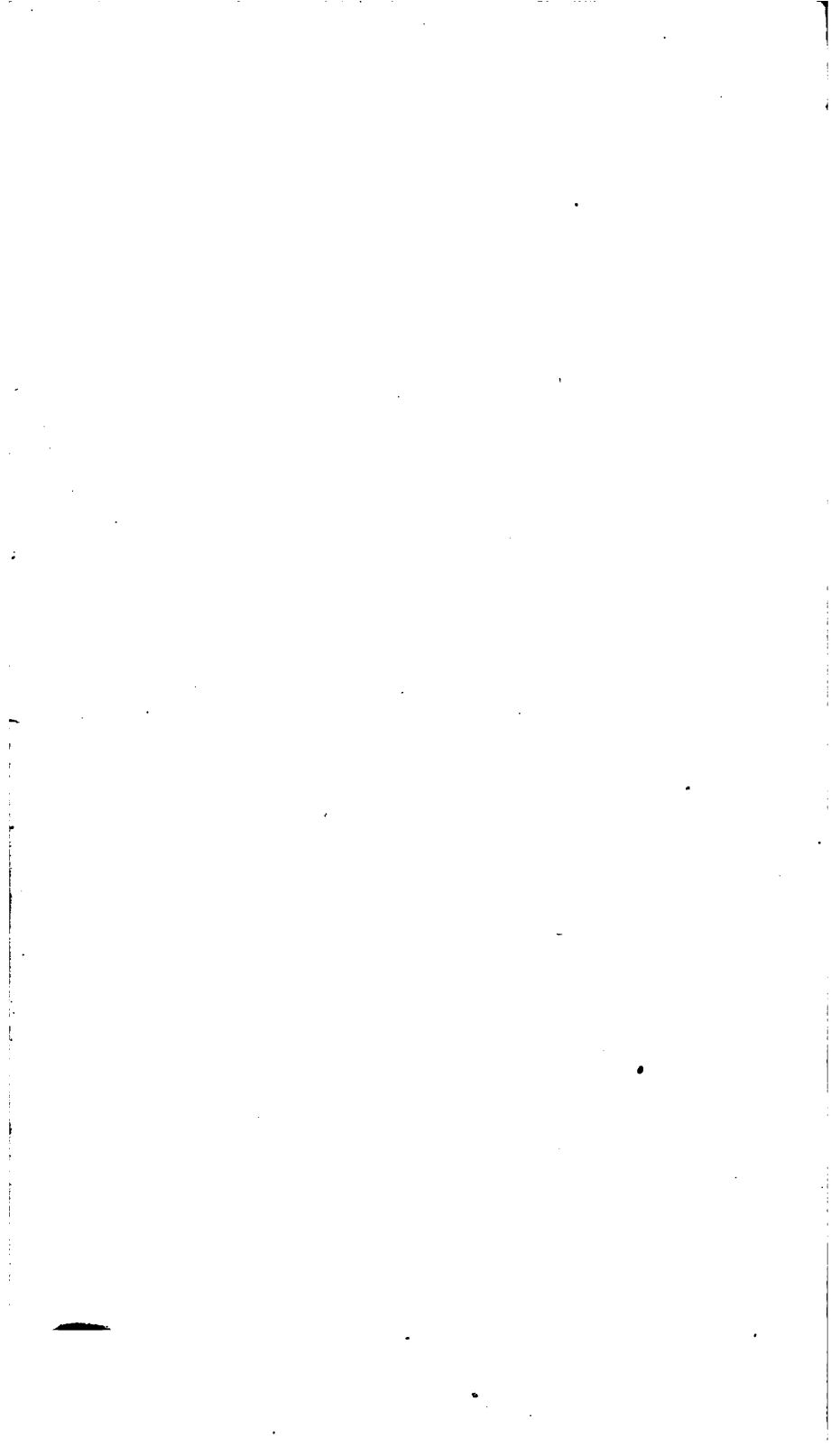
TABLE I

THE

COMMON LOGARITHMS

OF THE

NATURAL NUMBERS

N.	0	1	2	3	4	5	6	7	8	9
100	00 000	043	087	130	173	217	260	303	346	389
01	432	475	518	561	604	647	689	732	775	817
02	860	903	945	988	*030	*072	*115	*157	*199	*242
03	01 284	326	368	410	452	494	536	578	620	662
04	703	745	787	828	870	912	953	995	*036	*078
05	02 119	160	202	243	284	325	366	407	449	490
06	531	572	612	653	694	735	776	816	857	898
07	938	979	*019	*060	*100	*141	*181	*222	*262	*302
08	03 342	383	423	463	503	543	583	623	663	703
09	743	782	822	862	902	941	981	*021	*060	*100
110	04 139	179	218	258	297	336	376	415	454	493
11	532	571	610	650	689	727	766	805	844	883
12	922	961	999	*038	*077	*115	*154	*192	*231	*269
13	05 308	346	385	423	461	500	538	576	614	652
14	690	729	767	805	843	881	918	956	994	*032
15	06 070	108	145	183	221	258	296	333	371	408
16	446	483	521	558	595	633	670	707	744	781
17	819	856	893	930	967	*004	*041	*078	*115	*151
18	07 188	225	262	298	335	372	408	445	482	518
19	555	591	628	664	700	737	773	809	846	882
120	918	954	990	*027	*063	*099	*135	*171	*207	*243
21	08 279	314	350	386	422	458	493	529	565	600
22	636	672	707	743	778	814	849	884	920	955
23	991	*026	*061	*096	*132	*167	*202	*237	*272	*307
24	09 342	377	412	447	482	517	552	587	621	656
25	691	726	760	795	830	864	899	934	968	*003
26	10 037	072	106	140	175	209	243	278	312	346
27	380	415	449	483	517	551	585	619	653	687
28	721	755	789	823	857	890	924	958	992	*025
29	11 059	093	126	160	193	227	261	294	327	361
130	394	428	461	494	528	561	594	628	661	694
31	727	760	793	826	860	893	926	959	992	*024
32	12 057	090	123	156	189	222	254	287	320	352
33	385	418	450	483	516	548	581	613	646	678
34	710	743	775	808	840	872	905	937	969	*001
35	13 033	066	098	130	162	194	226	258	290	322
36	354	386	418	450	481	513	545	577	609	640
37	672	704	735	767	799	830	862	893	925	956
38	988	*019	*051	*082	*114	*145	*176	*208	*239	*270
39	14 301	333	364	395	426	457	489	520	551	582
140	613	644	675	706	737	768	799	829	860	891
41	922	953	983	*014	*045	*076	*106	*137	*168	*198
42	15 229	259	290	320	351	381	412	442	473	503
43	534	564	594	625	655	685	715	746	776	806
44	835	866	897	927	957	987	*017	*047	*077	*107
45	16 137	167	197	227	256	286	316	346	376	406
46	435	465	495	524	554	584	613	643	673	702
47	732	761	791	820	850	879	909	938	967	997
48	17 026	056	085	114	143	173	202	231	260	289
49	319	348	377	406	435	464	493	522	551	580
150	609	638	667	696	725	754	782	811	840	869
N.	0	1	2	3	4	5	6	7	8	9

Prop. Pts.

	44	43	42
1	4.4	4.3	4.2
2	8.8	8.6	8.4
3	13.2	12.9	12.6
4	17.6	17.2	16.8
5	22.0	21.5	21.0
6	26.4	25.8	25.2
7	30.8	30.1	29.4
8	35.2	34.4	33.6
9	39.6	38.7	37.8

	41	40	39
1	4.1	4.0	3.9
2	8.2	8.0	7.8
3	12.3	12.0	11.7
4	16.4	16.0	15.6
5	20.5	20.0	19.5
6	24.6	24.0	23.4
7	28.7	28.0	27.3
8	32.8	32.0	31.2
9	36.9	36.0	35.1

	38	37	36
1	3.8	3.7	3.6
2	7.6	7.4	7.2
3	11.4	11.1	10.8
4	15.2	14.8	14.4
5	19.0	18.5	18.0
6	22.8	22.2	21.6
7	26.6	25.9	25.2
8	30.4	29.6	28.8
9	34.2	33.3	32.4

	35	34	33
1	3.5	3.4	3.3
2	7.0	6.8	6.6
3	10.5	10.2	9.9
4	14.0	13.6	13.2
5	17.5	17.0	16.5
6	21.0	20.4	19.8
7	24.5	23.8	23.1
8	28.0	27.2	26.4
9	31.5	30.6	29.7

	32	31	30
1	3.2	3.1	3.0
2	6.4	6.2	6.0
3	9.6	9.3	9.0
4	12.8	12.4	12.0
5	16.0	15.5	15.0
6	19.2	18.6	18.0
7	22.4	21.7	21.0
8	25.6	24.8	24.0
9	28.8	27.9	27.0

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.		
150	17 609	638	667	696	725	754	782	811	840	869			
51	898	926	955	984	*013	*041	*070	*099	*127	*156			
52	18 184	213	241	270	298	327	355	384	412	441			
53	469	498	526	554	583	611	639	667	696	724			
54	752	780	808	837	865	893	921	949	977	*005			
55	19 033	061	089	117	145	173	201	229	257	285			
56	312	340	368	396	424	451	479	507	535	562			
57	590	618	645	673	700	728	756	783	811	838			
58	866	893	921	948	976	*003	*030	*058	*085	*112			
59	20 140	167	194	222	249	276	303	330	358	385			
160	412	439	466	493	520	548	575	602	629	656			
											29	**28**	**27**
61	683	710	737	763	790	817	844	871	898	925			
62	952	978	*005	*032	*059	*085	*112	*139	*165	*192	1 2.9	2.8	2.7
63	21 219	245	272	299	325	352	378	405	431	458	2 5.8	5.6	5.4
64	484	511	537	564	590	617	643	669	696	722	3 8.7	8.4	8.1
65	748	775	801	827	854	880	906	932	958	985	4 11.6	11.2	10.8
66	22 011	037	063	089	115	141	167	194	220	246	5 14.5	14.0	13.5
											6 17.4	16.8	16.2
67	272	298	324	350	376	401	427	453	479	505	7 20.3	19.6	18.9
68	531	557	583	608	634	660	686	712	737	763	8 23.2	22.4	21.6
69	789	814	840	866	891	917	943	968	994	*019	9 26.1	25.2	24.3
170	23 045	070	096	121	147	172	198	223	249	274			
											26	**25**	**24**
71	300	325	350	376	401	426	452	477	502	528	1 2.6	2.5	2.4
72	553	578	603	629	654	679	704	729	754	779	2 5.2	5.0	4.8
73	805	830	855	880	905	930	955	980	*005	*030	3 7.8	7.5	7.2
74	24 055	080	105	130	155	180	204	229	254	279	4 10.4	10.0	9.6
75	304	329	353	378	403	428	452	477	502	527	5 13.0	12.5	12.0
76	551	576	601	625	650	674	699	724	748	773	6 15.6	15.0	14.4
77	797	822	846	871	895	920	944	969	993	*018	7 18.2	17.5	16.8
78	25 042	066	091	115	139	164	188	212	237	261	8 20.8	20.0	19.2
79	285	310	334	358	382	406	431	455	479	503	9 23.4	22.5	21.6
180	527	551	575	600	624	648	672	696	720	744			
											23	**22**	**21**
81	768	792	816	840	864	888	912	935	959	983	1 2.3	2.2	2.1
82	26 007	031	055	079	102	126	150	174	198	221	2 4.6	4.4	4.2
83	245	269	293	316	340	364	387	411	435	458	3 6.9	6.6	6.3
84	482	505	529	553	576	600	623	647	670	694	4 9.2	8.8	8.4
85	717	741	764	788	811	834	858	881	905	928	5 11.5	11.0	10.5
86	951	975	998	*021	*045	*008	*091	*114	*138	*161	6 13.8	13.2	12.6
87	27 184	207	231	254	277	300	323	346	370	393	7 16.1	15.4	14.7
88	416	439	462	485	508	531	554	577	600	623	8 18.4	17.6	16.8
89	646	669	692	715	738	761	784	807	830	852	9 20.7	19.8	18.9
190	875	898	921	944	967	989	*012	*035	*058	*081			
91	28 103	126	149	171	194	217	240	262	285	307			
92	330	353	375	398	421	443	466	488	511	533			
93	556	578	601	623	646	668	691	713	735	758			
94	780	803	825	847	870	892	914	937	959	981			
95	29 003	026	048	070	092	115	137	159	181	203			
96	226	248	270	292	314	336	358	380	403	425			
97	447	469	491	513	535	557	579	601	623	645			
98	667	688	710	732	754	776	798	820	842	863			
99	885	907	929	951	973	994	*016	*038	*060	*081			
200	30 103	125	146	168	190	211	233	255	276	298			
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	Prop. Pts.		

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.		
200	30 103	125	146	168	190	211	233	255	276	298			
01	320	341	363	384	406	428	449	471	492	514			
02	535	557	578	600	621	643	664	685	707	728			
03	750	771	792	814	835	856	878	899	920	942			
04	963	984	*006	*027	*048	*069	*091	*112	*133	*154			
05	31 175	197	218	239	260	281	302	323	345	366			
06	387	408	429	450	471	492	513	534	555	576			
07	597	618	639	660	681	702	723	744	765	785			
08	806	827	848	869	890	911	931	952	973	99			
09	32 015	035	056	077	098	118	139	160	181	201			
210	222	243	263	284	305	325	346	300	387	408			
											22	**21**	**20**
11	428	449	469	490	510	531	552	572	593	613			
12	634	654	675	695	715	736	756	777	797	818			
13	838	858	879	899	919	940	960	980	*001	*021	1 2.2	2.1	2.0
14	33 041	062	082	102	122	143	163	183	203	224	2 4.4	4.2	4.0
15	244	264	284	304	325	345	365	385	405	425	3 6.6	6.3	6.0
16	445	465	486	506	526	546	566	586	606	626	4 8.8	8.4	8.0
											5 11.0	10.5	10.0
											6 13.2	12.6	12.0
17	646	666	686	706	726	746	766	786	806	826	7 15.4	14.7	14.0
18	846	866	885	905	925	945	965	985	*005	*025	8 17.6	16.8	16.0
19	34 044	064	084	104	124	143	163	183	203	223	9 19.8	18.9	18.0
220	242	262	282	301	321	341	361	380	400	420			
21	439	459	479	498	518	537	557	577	596	616			
22	635	655	674	694	713	733	753	772	792	811			
23	830	850	869	889	908	928	947	967	986	*005			
24	35 025	044	064	083	102	122	141	160	180	199			
25	218	238	257	276	295	315	334	353	372	392			
26	411	430	449	468	488	507	526	545	564	583			
27	603	622	641	660	679	698	717	736	755	774			
28	793	813	832	851	870	889	908	927	946	965			
29	984	*003	*021	*040	*059	*078	*097	*116	*135	*154			
230	36 173	192	211	229	248	267	286	305	324	342			
											19	**18**	**17**
31	361	380	399	418	436	455	474	493	511	530			
32	549	568	586	605	624	642	661	680	698	717	1 1.9	1.8	1.7
33	736	754	773	791	810	829	847	866	884	903	2 3.8	3.6	3.4
											3 5.7	5.4	5.1
34	922	940	959	977	996	*014	*033	*051	*070	*088	4 7.6	7.2	6.8
35	37 107	125	144	162	181	199	218	236	254	273	5 9.5	9.0	8.5
36	291	310	328	346	365	383	401	420	438	457	6 11.4	10.8	10.2
37	475	493	511	530	548	566	585	603	621	639	7 13.3	12.6	11.9
38	658	676	694	712	731	749	767	785	803	822	8 15.2	14.4	13.6
39	840	858	876	894	912	931	949	967	985	*003	9 17.1	16.2	15.3
240	38 021	039	057	075	093	112	130	148	166	184			
41	202	220	238	256	274	292	310	328	346	364			
42	382	399	417	435	453	471	489	507	525	543			
43	561	578	596	614	632	650	668	686	703	721			
44	739	757	775	792	810	828	846	863	881	899			
45	917	934	952	970	987	*005	*023	*041	*058	*076			
46	39 094	111	129	146	164	182	199	217	235	252			
47	270	287	305	322	340	358	375	393	410	428			
48	445	463	480	498	515	533	550	568	585	602			
49	620	637	655	672	690	707	724	742	759	777			
250	794	811	829	846	863	881	898	915	933	950			
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.		

N.	0	1	2	3	4	5	6	7	8	9
250	39 794	811	829	846	863	881	898	915	933	950
51	967	985	*002	*019	*037	*054	*071	*088	*106	*123
52	40 140	157	175	192	209	226	243	261	278	295
53	312	329	346	364	381	398	415	432	449	466
54	483	500	518	535	552	569	586	603	620	637
55	654	671	688	705	722	739	756	773	790	807
56	824	841	858	875	892	909	926	943	960	976
57	993	*010	*027	*044	*061	*078	*095	*111	*128	*145
58	41 162	179	196	212	229	246	263	280	296	313
59	330	347	363	380	397	414	430	447	464	481
260	497	514	531	547	564	581	597	614	631	647
61	664	681	697	714	731	747	764	780	797	814
62	830	847	863	880	896	913	929	946	963	979
63	996	*012	*029	*045	*062	*078	*095	*111	*127	*144
64	42 160	177	193	210	226	243	259	275	292	308
65	325	341	357	374	390	406	423	439	455	472
66	488	504	521	537	553	570	586	602	619	635
67	651	667	684	700	716	732	749	765	781	797
68	813	830	846	862	878	894	911	927	943	959
69	975	991	*008	*024	*040	*056	*072	*088	*104	*120
270	43 136	152	169	185	201	217	233	249	265	281
71	297	313	329	345	361	377	393	409	425	441
72	457	473	489	505	521	537	553	569	584	600
73	616	632	648	664	680	696	712	727	743	759
74	775	791	807	823	838	854	870	886	902	917
75	933	949	965	981	996	*012	*028	*044	*059	*075
76	44 091	107	122	138	154	170	185	201	217	232
77	248	264	279	295	311	326	342	358	373	389
78	404	420	436	451	467	483	498	514	529	545
79	560	576	592	607	623	638	654	669	685	700
280	716	731	747	762	778	793	809	824	840	855
81	871	886	902	917	932	948	963	979	994	*010
82	45 025	040	056	071	086	102	117	133	148	163
83	179	194	209	225	240	255	271	286	301	317
84	332	347	362	378	393	408	423	439	454	469
85	484	500	515	530	545	561	576	591	606	621
86	637	652	667	682	697	712	728	743	758	773
87	788	803	818	834	849	864	879	894	909	924
88	939	954	969	984	*000	*015	*030	*045	*060	*075
89	46 090	105	120	135	150	165	180	195	210	225
290	240	255	270	285	300	315	330	345	359	374
91	389	404	419	434	449	464	479	494	509	523
92	538	553	568	583	598	613	627	642	657	672
93	687	702	716	731	746	761	776	790	805	820
94	835	850	864	879	894	909	923	938	953	967
95	982	997	*012	*026	*041	*056	*070	*085	*100	*114
96	47 129	144	159	173	188	202	217	232	246	261
97	276	290	305	319	334	349	363	378	392	407
98	422	436	451	465	480	494	509	524	538	553
99	567	582	596	611	625	640	654	669	683	698
300	712	727	741	756	770	784	799	813	828	842
N.	0	1	2	3	4	5	6	7	8	9

Prop. Pts.

	18	17	16
1	1.8	1.7	1.6
2	3.6	3.4	3.2
3	5.4	5.1	4.8
4	7.2	6.8	6.4
5	9.0	8.5	8.0
6	10.8	10.2	9.6
7	12.6	11.9	11.2
8	14.4	13.6	12.8
9	16.2	15.3	14.4

	15	14
1	1.5	1.4
2	3.0	2.8
3	4.5	4.2
4	6.0	5.6
5	7.5	7.0
6	9.0	8.4
7	10.5	9.8
8	12.0	11.2
9	13.5	12.6

N.	0	1	2	3	4	5	6	7	8	9
300	47 712	727	741	756	770	784	799	813	828	842
01	857	871	885	900	914	929	943	958	972	986
02	48 001	015	029	044	058	073	087	101	116	130
03	144	159	173	187	202	216	230	244	259	273
04	287	302	316	330	344	359	373	387	401	416
05	430	444	458	473	487	501	515	530	544	558
06	572	586	601	615	629	643	657	671	686	700
07	714	728	742	756	770	785	799	813	827	841
08	855	869	883	897	911	926	940	954	968	982
09	996	*010	*024	*038	*052	*066	*080	*094	*108	*122
310	49 136	150	164	178	192	206	220	234	248	262
11	276	290	304	318	332	346	360	374	388	402
12	415	429	443	457	471	485	499	513	527	541
13	554	568	582	596	610	624	638	651	665	679
14	693	707	721	734	748	762	776	790	803	817
15	831	845	859	872	886	900	914	927	941	955
16	969	982	996	*010	*024	*037	*051	*065	*079	*092
17	50 106	120	133	147	161	174	188	202	215	229
18	243	256	270	284	297	311	325	338	352	365
19	379	393	406	420	433	447	461	474	488	501
320	515	529	542	556	569	583	596	610	623	637
21	651	664	678	691	705	718	732	745	759	772
22	786	799	813	826	840	853	866	880	893	907
23	920	934	947	961	974	987	*001	*014	*028	*041
24	51 055	068	081	095	108	121	135	148	162	175
25	188	202	215	228	242	255	268	282	295	308
26	322	335	348	362	375	388	402	415	428	441
27	455	468	481	495	508	521	534	548	561	574
28	587	601	614	627	640	654	667	680	693	706
29	720	733	746	759	772	786	799	812	825	838
330	851	865	878	891	904	917	930	943	957	970
31	983	996	*009	*022	*035	*048	*061	*075	*088	*101
32	52 114	127	140	153	166	179	192	205	218	231
33	244	257	270	284	297	310	323	336	349	362
34	375	388	401	414	427	440	453	466	479	492
35	504	517	530	543	556	569	582	595	608	621
36	634	647	660	673	686	699	711	724	737	750
37	763	776	789	802	815	827	840	853	866	879
38	892	905	917	930	943	956	969	982	994	*007
39	53 020	033	046	058	071	084	097	110	122	135
340	148	161	173	186	199	212	224	237	250	263
41	275	288	301	314	326	339	352	364	377	390
42	403	415	428	441	453	466	479	491	504	517
43	529	542	555	567	580	593	605	618	631	643
44	656	668	681	694	706	719	732	744	757	769
45	782	794	807	820	832	845	857	870	882	895
46	908	920	933	945	958	970	983	995	*008	*020
47	54 033	045	058	070	083	095	108	120	133	145
48	158	170	183	195	208	220	233	245	258	270
49	283	295	307	320	332	345	357	370	382	394
350	407	419	432	444	456	469	481	494	506	518
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**

Prop. Pts.

	15	14
1	1.5	1.4
2	3.0	2.8
3	4.5	4.2
4	6.0	5.6
5	7.5	7.0
6	9.0	8.4
7	10.5	9.8
8	12.0	11.2
9	13.5	12.6

	13	12
1	1.3	1.2
2	2.6	2.4
3	3.9	3.6
4	5.2	4.8
5	6.5	6.0
6	7.8	7.2
7	9.1	8.4
8	10.4	9.6
9	11.7	10.8

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
350	54 407	419	432	444	456	469	481	494	506	518	
51	531	543	555	568	580	593	605	617	630	642	
52	654	667	679	691	704	716	728	741	753	765	
53	777	790	802	814	827	839	851	864	876	888	
54	900	913	925	937	949	962	974	986	998	*011	
55	55 023	035	047	060	072	084	096	108	121	133	
56	145	157	169	182	194	206	218	230	242	255	
57	267	279	291	303	315	328	340	352	364	376	
58	388	400	413	425	437	449	461	473	485	497	
59	509	522	534	546	558	570	582	594	606	618	
360	630	642	654	666	678	691	703	715	727	739	
61	751	763	775	787	799	811	823	835	847	859	
62	871	883	895	907	919	931	943	955	967	979	
63	991	*003	*015	*027	*038	*050	*062	*074	*086	*098	
64	56 110	122	134	146	158	170	182	194	205	217	
65	229	241	253	265	277	289	301	312	324	336	
66	348	360	372	384	396	407	419	431	443	455	
67	467	478	490	502	514	526	538	549	561	573	
68	585	597	608	620	632	644	656	667	679	691	
69	703	714	726	738	750	761	773	785	797	808	
370	820	832	844	855	867	879	891	902	914	926	
71	937	949	961	972	984	996	*008	*019	*031	*043	
72	57 054	066	078	089	101	113	124	136	148	159	
73	171	183	194	206	217	229	241	252	264	276	
74	287	299	310	322	334	345	357	368	380	392	
75	403	415	426	438	449	461	473	484	496	507	
76	519	530	542	553	565	576	588	600	611	623	
77	634	646	657	669	680	692	703	715	726	738	
78	749	761	772	784	795	807	818	830	841	852	
79	864	875	887	898	910	921	933	944	955	967	
380	978	990	*001	*013	*024	*035	*047	*058	*070	*081	
81	58 092	104	115	127	138	149	161	172	184	195	
82	206	218	229	240	252	263	274	286	297	309	
83	320	331	343	354	365	377	388	399	410	422	
84	433	444	456	467	478	490	501	512	524	535	
85	546	557	569	580	591	602	614	625	636	647	
86	659	670	681	692	704	715	726	737	749	760	
87	771	782	794	805	816	827	838	850	861	872	
88	883	894	906	917	928	939	950	961	973	984	
89	995	*006	*017	*028	*040	*051	*062	*073	*084	*095	
390	59 106	118	129	140	151	162	173	184	195	207	
91	218	229	240	251	262	273	284	295	306	318	
92	329	340	351	362	373	384	395	406	417	428	
93	439	450	461	472	483	494	506	517	528	539	
94	550	561	572	583	594	605	616	627	638	649	
95	660	671	682	693	704	715	726	737	748	759	
96	770	780	791	802	813	824	835	846	857	868	
97	879	890	901	912	923	934	945	956	966	977	
98	988	999	*010	*021	*032	*043	*054	*065	*076	*086	
99	60 097	108	119	130	141	152	163	173	184	195	
400	206	217	228	239	249	260	271	282	293	304	
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

Prop. Pts.

	13	12
1	1.3	1.2
2	2.6	2.4
3	3.9	3.6
4	5.2	4.8
5	6.5	6.0
6	7.8	7.2
7	9.1	8.4
8	10.4	9.6
9	11.7	10.8

	11	10
1	1.1	1.0
2	2.2	2.0
3	3.3	3.0
4	4.4	4.0
5	5.5	5.0
6	6.6	6.0
7	7.7	7.0
8	8.8	8.0
9	9.9	9.0

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
400	60 206	217	228	239	249	260	271	282	293	304	
01	314	325	336	347	358	369	379	390	401	412	
02	.423	433	444	455	466	477	487	498	509	520	
03	531	541	552	563	574	584	595	606	617	627	
04	638	649	660	670	681	692	703	713	724	735	
05	746	756	767	778	788	799	810	821	831	842	
06	853	863	874	885	895	906	917	927	938	949	
07	959	970	981	991	*002	*013	*023	*034	*045	*055	
08	61 066	077	087	098	109	119	130	140	151	162	
09	172	183	194	204	215	225	236	247	257	268	
410	278	289	300	310	321	331	342	352	363	374	
11	384	395	405	416	426	437	448	458	469	479	
12	490	500	511	521	532	542	553	563	574	584	
13	595	606	616	627	637	648	658	669	679	690	
14	700	711	721	731	742	752	763	773	784	794	
15	805	815	826	836	847	857	868	878	888	899	
16	909	920	930	941	951	962	972	982	993	*003	
17	62 014	024	034	045	055	066	076	086	097	107	
18	118	128	138	149	159	170	180	190	201	211	
19	221	232	242	252	263	273	284	294	304	315	
420	325	335	346	356	366	377	387	397	408	418	
21	428	439	449	459	469	480	490	500	511	521	
22	531	542	552	562	572	583	593	603	613	624	
23	634	644	655	665	675	685	696	706	716	726	
24	737	747	757	767	778	788	798	808	818	829	
25	839	849	859	870	880	890	900	910	921	931	
26	941	951	961	972	982	992	*002	*012	*022	*033	
27	63 043	053	063	073	083	094	104	114	124	134	
28	144	155	165	175	185	195	205	215	225	236	
29	246	256	266	276	286	296	306	317	327	337	
430	347	357	367	377	387	397	407	417	428	438	
31	448	458	468	478	488	498	508	518	528	538	
32	548	558	568	579	589	599	609	619	629	639	
33	649	659	669	679	689	699	709	719	729	739	
34	749	759	769	779	789	799	809	819	829	839	
35	849	859	869	879	889	899	909	919	929	939	
36	949	959	969	979	988	998	*008	*018	*028	*038	
37	64 048	058	068	078	088	098	108	118	128	137	
38	147	157	167	177	187	197	207	217	227	237	
39	246	256	266	276	286	296	306	316	326	335	
440	345	355	365	375	385	395	404	414	424	434	
41	444	454	464	473	483	493	503	513	523	532	
42	542	552	562	572	582	591	601	611	621	631	
43	640	650	660	670	680	689	699	709	719	729	
44	738	748	758	768	777	787	797	807	816	826	
45	836	846	856	865	875	885	895	904	914	924	
46	933	943	953	963	972	982	992	*002	*011	*021	
47	65 031	040	050	060	070	079	089	099	108	118	
48	128	137	147	157	167	176	186	196	205	215	
49	225	234	244	254	263	273	283	292	302	312	
450	321	331	341	350	360	369	379	389	398	408	
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

Prop. Pts.

	11	10	9
1	1.1	1.0	0.9
2	2.2	2.0	1.8
3	3.3	3.0	2.7
4	4.4	4.0	3.6
5	5.5	5.0	4.5
6	6.6	6.0	5.4
7	7.7	7.0	6.3
8	8.8	8.0	7.2
9	9.9	9.0	8.1

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
450	65 321	331	341	350	360	369	379	389	398	408	
51	418	427	437	447	456	466	475	485	495	504	
52	514	523	533	543	552	562	571	581	591	600	
53	610	619	629	639	648	658	667	677	686	696	
54	706	715	725	734	744	753	763	772	782	792	
55	801	811	820	830	839	849	858	868	877	887	
56	896	906	916	925	935	944	954	963	973	982	
57	992	*001	*011	*020	*030	*039	*049	*058	*068	*077	
58	66 087	096	106	115	124	134	143	153	162	172	
59	181	191	200	210	219	229	238	247	257	266	
460	276	285	295	304	314	323	332	342	351	361	
61	370	380	389	398	408	417	427	436	445	455	
62	464	474	483	492	502	511	521	530	539	549	
63	558	567	577	586	596	6c5	614	624	633	642	
64	652	661	671	680	689	699	708	717	727	736	
65	745	755	764	773	783	792	801	811	820	829	
66	839	848	857	867	876	885	894	904	913	922	
67	932	941	950	960	969	978	987	997	*006	*015	
68	67 025	034	043	052	062	071	080	089	099	108	
69	117	127	136	145	154	164	173	182	191	201	
470	210	219	228	237	247	256	265	274	284	293	
71	302	311	321	330	339	348	357	367	376	385	
72	394	403	413	422	431	440	449	459	468	477	
73	486	495	504	514	523	532	541	550	560	569	
74	578	587	596	605	614	624	633	642	651	660	
75	669	679	688	697	706	715	724	733	742	752	
76	761	770	779	788	797	806	815	825	834	843	
77	852	861	870	879	888	897	906	916	925	934	
78	943	952	961	970	979	988	997	*006	*015	*024	
79	68 034	043	052	061	070	079	088	097	106	115	
480	124	133	142	151	160	169	178	187	196	205	
81	215	224	233	242	251	260	269	278	287	296	
82	305	314	323	332	341	350	359	368	377	386	
83	395	404	413	422	431	440	449	458	467	476	
84	485	494	502	511	520	529	538	547	556	565	
85	574	583	592	601	610	619	628	637	646	655	
86	664	673	681	690	699	708	717	726	735	744	
87	753	762	771	780	789	797	806	815	824	833	
88	842	851	860	869	878	886	895	904	913	922	
89	931	940	949	958	966	975	984	993	*002	*011	
490	69 020	028	037	046	055	064	073	082	090	099	
91	108	117	126	135	144	152	161	170	179	188	
92	197	205	214	223	232	241	249	258	267	276	
93	285	294	302	311	320	329	338	346	355	364	
94	373	381	390	399	408	417	425	434	443	452	
95	461	469	478	487	496	504	513	522	531	539	
96	548	557	566	574	583	592	601	609	618	627	
97	636	644	653	662	671	679	688	697	705	714	
98	723	732	740	749	758	767	775	784	793	801	
99	810	819	827	836	845	854	862	871	880	888	
500	897	906	914	923	932	940	949	958	966	975	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	Prop. Pts.

Prop. Pts.

	10	9	8
1	1.0	0.9	0.8
2	2.0	1.8	1.6
3	3.0	2.7	2.4
4	4.0	3.6	3.2
5	5.0	4.5	4.0
6	6.0	5.4	4.8
7	7.0	6.3	5.6
8	8.0	7.2	6.4
9	9.0	8.1	7.2

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
500	69 897	906	914	923	932	940	949	958	966	975	
01	984	992	*001	*010	*018	*027	*036	*044	*053	*062	
02	70 070	079	088	096	105	114	122	131	140	148	
03	157	165	174	183	191	200	209	217	226	234	
04	243	252	260	269	278	286	295	303	312	321	
05	329	338	346	355	364	372	381	389	398	406	
06	415	424	432	441	449	458	467	475	484	492	
07	501	509	518	526	535	544	552	561	569	578	
08	586	595	603	612	621	629	638	646	655	663	
09	672	680	689	697	706	714	723	731	740	749	
510	757	766	774	783	791	800	808	817	825	834	
11	842	851	859	868	876	885	893	902	910	919	
12	927	935	944	952	961	969	978	986	995	*003	
13	71 012	020	029	037	046	054	063	071	079	088	
14	096	105	113	122	130	139	147	155	164	172	
15	181	189	198	206	214	223	231	240	248	257	
16	265	273	282	290	299	307	315	324	332	341	
17	349	357	366	374	383	391	399	408	416	425	
18	433	441	450	458	466	475	483	492	500	508	
19	517	525	533	542	550	559	567	575	584	592	
520	600	609	617	625	634	642	650	659	667	675	
21	684	692	700	709	717	725	734	742	750	759	
22	767	775	784	792	800	809	817	825	834	842	
23	850	858	867	875	883	892	900	908	917	925	
24	933	941	950	958	966	975	983	991	999	*008	
25	72 016	024	032	041	049	057	066	074	082	090	
26	099	107	115	123	132	140	148	156	165	173	
27	181	189	198	206	214	222	230	239	247	255	
28	263	272	280	288	296	304	313	321	329	337	
29	346	354	362	370	378	387	395	403	411	419	
530	428	436	444	452	460	469	477	485	493	501	
31	509	518	526	534	542	550	558	567	575	583	
32	591	599	607	616	624	632	640	648	656	665	
33	673	681	689	697	705	713	722	730	738	746	
34	754	762	770	779	787	795	803	811	819	827	
35	835	843	852	860	868	876	884	892	900	908	
36	916	925	933	941	949	957	965	973	981	989	
37	997	*006	*014	*022	*030	*038	*046	*054	*062	*070	
38	73 078	086	094	102	111	119	127	135	143	151	
39	159	167	175	183	191	199	207	215	223	231	
540	239	247	255	263	272	280	288	296	304	312	
41	320	328	336	344	352	360	368	376	384	392	
42	400	408	416	424	432	440	448	456	464	472	
43	480	488	496	504	512	520	528	536	544	552	
44	560	568	576	584	592	600	608	616	624	632	
45	640	648	656	664	672	679	687	695	703	711	
46	719	727	735	743	751	759	767	775	783	791	
47	799	807	815	823	830	838	846	854	862	870	
48	878	886	894	902	910	918	926	933	941	949	
49	957	965	973	981	989	997	*005	*013	*020	*028	
550	74 036	044	052	060	068	076	084	092	099	107	
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

	9	8	7
1	0.9	0.8	0.7
2	1.8	1.6	1.4
3	2.7	2.4	2.1
4	3.6	3.2	2.8
5	4.5	4.0	3.5
6	5.4	4.8	4.2
7	6.3	5.6	4.9
8	7.2	6.4	5.6
9	8.1	7.2	6.3

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
550	74 036	044	052	060	068	076	084	092	099	107	
51	115	123	131	139	147	155	162	170	178	186	
52	194	202	210	218	225	233	241	249	257	265	
53	273	280	288	296	304	312	320	327	335	343	
54	351	359	367	374	382	390	398	406	414	421	
55	429	437	445	453	461	468	476	484	492	500	
56	507	515	523	531	539	547	554	562	570	578	
57	586	593	601	609	617	624	632	640	648	656	
58	663	671	679	687	695	702	710	718	726	733	
59	741	749	757	764	772	780	788	796	803	811	
560	819	827	834	842	850	858	865	873	881	889	
61	896	·904	912	920	927	*935	943	950	*958	966	
62	974	981	989	997	*005	*012	*020	*028	*035	*043	
63	75 051	059	066	074	082	089	097	105	113	120	
64	128	136	143	151	159	166	174	182	189	197	
65	205	213	220	228	236	243	251	259	266	274	
66	282	289	297	305	312	320	328	335	343	351	
67	358	366	374	381	389	397	404	412	420	427	
68	435	442	450	458	465	473	481	488	496	504	
69	511	519	526	534	542	549	557	565	572	580	
570	587	595	603	610	618	626	633	641	648	656	
71	664	671	679	686	694	702	709	717	724	732	
72	740	747	755	762	770	778	785	793	800	808	
73	815	823	831	838	846	853	861	868	876	884	
74	891	899	906	914	921	929	937	944	952	959	
75	967	974	982	989	997	*005	*012	*020	*027	*035	
76	76 042	050	057	065	072	080	087	095	103	110	
77	118	125	133	140	148	155	163	170	178	185	
78	193	200	208	215	223	230	238	245	253	260	
79	268	275	283	290	298	305	313	320	328	335	
580	343	350	358	365	373	380	388	395	403	410	
81	418	425	433	440	448	455	462	470	477	485	
82	492	500	507	515	522	530	537	545	552	559	
83	567	574	582	589	597	604	612	619	626	634	
84	641	649	656	664	671	678	686	693	701	708	
85	716	723	730	738	745	753	760	768	775	782	
86	790	797	805	812	819	827	834	842	849	856	
87	864	871	879	886	893	901	908	916	923	930	
88	938	945	·953	960	967	975	982	989	997	*004	
89	77 012	019	026	034	041	048	056	063	070	078	
590	085	093	100	107	115	122	129	137	144	151	
91	159	166	173	181	188	195	203	210	217	225	
92	232	240	247	254	262	269	276	283	291	298	
93	305	313	320	327	335	342	349	357	364	371	
94	379	386	393	401	408	415	422	430	437	444	
95	452	459	466	474	481	488	495	503	510	517	
96	525	532	539	546	554	561	568	576	583	590	
97	597	605	612	619	627	634	641	648	656	663	
98	670	677	685	692	699	706	714	721	728	735	
99	743	750	757	764	772	779	786	793	801	808	
600	815	822	830	837	844	851	859	866	873	880	
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

	8	7
1	0.8	0.7
2	1.6	1.4
3	2.4	2.1
4	3.2	2.8
5	4.0	3.5
6	4.8	4.2
7	5.6	4.9
8	6.4	5.6
9	7.2	6.3

N.	0	1	2	3	4	5	6	7	8	9
600	77 815	822	830	837	844	851	859	866	873	880
01	887	895	902	909	916	924	931	938	945	952
02	960	967	974	981	988	996	*003	*010	*017	*025
03	78 032	039	046	053	061	068	075	082	089	097
04	104	111	118	125	132	140	147	154	161	168
05	176	183	190	197	204	211	219	226	233	240
06	247	254	262	269	276	283	290	297	305	312
07	319	326	333	340	347	355	362	369	376	383
08	390	398	405	412	419	426	433	440	447	455
09	462	469	476	483	490	497	504	512	519	526
610	533	540	547	554	561	569	576	583	590	597
11	604	611	618	625	633	640	647	654	661	668
12	675	682	689	696	704	711	718	725	732	739
13	746	753	760	767	774	781	789	796	803	810
14	817	824	831	838	845	852	859	866	873	880
15	888	895	902	909	916	923	930	937	944	951
16	958	965	972	979	986	993	*000	*007	*014	*021
17	79 029	036	043	050	057	064	071	078	085	092
18	099	106	113	120	127	134	141	148	155	162
19	169	176	183	190	197	204	211	218	225	232
620	239	246	253	260	267	274	281	288	295	302
21	309	316	323	330	337	344	351	358	365	372
22	379	386	393	400	407	414	421	428	435	442
23	449	456	463	470	477	484	491	498	505	511
24	518	525	532	539	546	553	560	567	574	581
25	588	595	602	609	616	623	630	637	644	650
26	657	664	671	678	685	692	699	706	713	720
27	727	734	741	748	754	761	768	775	782	789
28	796	803	810	817	824	831	837	844	851	858
29	865	872	879	886	893	900	906	913	920	927
630	934	941	948	955	962	969	975	982	989	·996
31	80 003	010	017	024	030	037	044	051	058	065
32	072	079	085	092	099	106	113	120	127	134
33	140	147	154	161	168	175	182	188	195	202
34	209	216	223	229	236	243	250	257	264	271
35	277	284	291	298	305	312	318	325	332	339
36	346	353	359	366	373	380	387	393	400	407
37	414	421	428	434	441	448	455	462	468	475
38	482	489	496	502	509	516	523	530	536	543
39	550	557	564	570	577	584	591	598	604	611
640	618	625	632	638	645	652	659	665	672	679
41	686	693	699	706	713	720	726	733	740	747
42	754	760	767	774	781	787	794	801	808	814
43	821	828	835	841	848	855	862	868	875	882
44	889	895	902	909	916	922	929	936	943	949
45	956	963	969	976	983	990	996	*003	*010	*017
46	81 023	030	037	043	050	057	064	070	077	084
47	090	097	104	111	117	124	131	137	144	151
48	158	164	171	178	184	191	198	204	211	218
49	224	231	238	245	251	258	265	271	278	285
650	291	298	305	311	318	325	331	338	345	351
N.	0	1	2	3	4	5	6	7	8	9

Prop. Pts.

	8	7	6
1	0.8	0.7	0.6
2	1.6	1.4	1.2
3	2.4	2.1	1.8
4	3.2	2.8	2.4
5	4.0	3.5	3.0
6	4.8	4.2	3.6
7	5.6	4.9	4.2
8	6.4	5.6	4.8
9	7.2	6.3	5.4

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
650	81 291	298	305	311	318	325	331	338	345	351	
51	358	365	371	378	385	391	398	405	411	418	
52	425	431	438	445	451	458	465	471	478	485	
53	491	498	505	511	518	525	531	538	544	551	
54	558	564	571	578	584	591	598	604	611	617	
55	624	631	637	644	651	657	664	671	677	684	
56	690	697	704	710	717	723	730	737	743	750	
57	757	763	770	776	783	790	796	803	809	816	
58	823	829	836	842	849	856	862	869	875	882	
59	889	895	902	908	915	921	928	935	941	948	
660	954	961	968	974	981	987	994	*000	*007	*014	
61	82 020	027	033	040	046	053	060	066	073	079	
62	086	092	099	105	112	119	125	132	138	145	
63	151	158	164	171	178	184	191	197	204	210	
64	217	223	230	236	243	249	256	263	269	276	
65	282	289	295	302	308	315	321	328	334	341	
66	347	354	360	367	373	380	387	393	400	406	
67	413	419	426	432	439	445	452	458	465	471	
68	478	484	491	497	504	510	517	523	530	536	
69	543	549	556	562	569	575	582	588	595	601	
670	607	614	620	627	633	640	646	653	659	666	
71	672	679	685	692	698	705	711	718	724	730	
72	737	743	750	756	763	769	776	782	789	795	
73	802	808	814	821	827	834	840	847	853	860	
74	866	872	879	885	892	898	905	911	918	924	
75	930	937	943	950	956	963	969	975	982	988	
76	995	*001	*008	*014	*020	*027	*033	*040	*046	*052	
77	83 059	065	072	078	085	091	097	104	110	117	
78	123	129	136	142	149	155	161	168	174	181	
79	187	193	200	206	213	219	225	232	238	245	
680	251	257	264	270	276	283	289	296	302	308	
81	315	321	327	334	340	347	353	359	366	372	
82	378	385	391	398	404	410	417	423	429	436	
83	442	448	455	461	467	474	480	487	493	499	
84	506	512	518	525	531	537	544	550	556	563	
85	569	575	582	588	594	601	607	613	620	626	
86	632	639	645	651	658	664	670	677	683	689	
87	696	702	708	715	721	727	734	740	746	753	
88	759	765	771	778	784	790	797	803	809	816	
89	822	828	835	841	847	853	860	866	872	879	
690	885	891	897	904	910	916	923	929	935	942	
91	948	954	960	967	973	979	985	992	998	*004	
92	84 011	017	023	029	036	042	048	055	061	067	
93	073	080	086	092	098	105	111	117	123	130	
94	136	142	148	155	161	167	173	180	186	192	
95	198	205	211	217	223	230	236	242	248	255	
96	261	267	273	280	286	292	298	305	311	317	
97	323	330	336	342	348	354	361	367	373	379	
98	386	392	398	404	410	417	423	429	435	442	
99	448	454	460	466	473	479	485	491	497	504	
700	510	516	522	528	535	541	547	553	559	566	
N.	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	Prop. Pts.

Prop. Pts.

	7	6
1	0.7	0.6
2	1.4	1.2
3	2.1	1.8
4	2.8	2.4
5	3.5	3.0
6	4.2	3.6
7	4.9	4.2
8	5.6	4.8
9	6.3	5.4

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
700	24 510	516	522	528	533	542	5??	553	559	566	
01	572	578	584	590	597	603	609	615	621	628	
02	634	640	646	652	658	665	671	677	683	689	
03	696	702	708	714	720	726	733	739	745	751	
04	757	763	770	776	782	788	794	800	807	813	
05	819	825	831	837	844	850	856	862	868	874	
06	880	887	893	899	905	911	917	924	930	936	
07	942	948	954	960	967	973	979	985	991	997	
08	85 003	009	016	022	028	034	040	046	052	058	
09	065	071	077	083	089	095	101	107	114	120	
710	126	132	138	144	150	156	163	169	175	181	
11	187	193	199	205	211	217	224	230	236	242	
12	248	254	260	266	272	278	285	291	297	303	
13	309	315	321	327	333	339	345	352	358	364	
14	370	376	382	388	394	400	406	412	418	425	
15	431	437	443	449	455	461	467	473	479	485	
16	491	497	503	509	516	522	528	534	540	546	
17	552	558	564	570	576	582	588	594	600	606	
18	612	618	625	631	637	643	649	655	661	667	
19	673	679	685	691	697	703	709	715	721	727	
720	733	739	745	751	757	763	769	775	781	788	
21	794	800	806	812	818	824	830	836	842	848	
22	854	860	866	872	878	884	890	896	902	908	
23	914	920	926	932	938	944	950	956	962	968	
24	974	980	986	992	998	*004	*010	*016	*022	*028	
25	86 034	040	046	052	058	064	070	076	082	088	
26	094	100	106	112	118	124	130	136	141	147	
27	153	159	165	171	177	183	189	195	201	207	
28	213	219	225	231	237	243	249	255	261	267	
29	273	279	285	291	297	303	308	314	320	326	
730	332	338	344	350	356	362	368	374	380	386	
31	392	398	404	410	415	421	427	433	439	445	
32	451	457	463	469	475	481	487	493	499	504	
33	510	516	522	528	534	540	546	552	558	564	
34	570	576	581	587	593	599	605	611	617	623	
35	629	635	641	646	652	658	664	670	676	682	
36	688	694	700	705	711	717	723	729	735	741	
37	747	753	759	764	770	776	782	788	794	800	
38	806	812	817	823	829	835	841	847	853	859	
39	864	870	876	882	888	894	900	906	911	917	
740	923	929	935	941	947	953	958	964	970	976	
41	982	988	994	999	*005	*011	*017	*023	*029	*035	
42	87 040	046	052	058	064	070	075	081	087	093	
43	099	105	111	116	122	128	134	140	146	151	
44	157	163	169	175	181	186	192	198	204	210	
45	216	221	227	233	239	245	251	256	262	268	
46	274	280	286	291	297	303	309	315	320	326	
47	332	338	344	349	355	361	367	373	379	384	
48	390	396	402	408	413	419	425	431	437	442	
49	448	454	460	466	471	477	483	489	495	500	
750	506	512	518	523	529	535	541	547	552	558	
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

Prop. Pts.

	7	6	5
1	0.7	0.6	0.5
2	1.4	1.2	1.0
3	2.1	1.8	1.5
4	2.8	2.4	2.0
5	3.5	3.0	2.5
6	4.2	3.6	3.0
7	4.9	4.2	3.5
8	5.6	4.8	4.0
9	6.3	5.4	4.5

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
750	87 506	512	518	523	529	535	541	547	552	558	
51	564	570	576	581	587	593	599	604	610	616	
52	622	628	633	639	645	651	656	662	668	674	
53	679	685	691	697	703	708	714	720	726	731	
54	737	743	749	754	760	766	772	777	783	789	
55	795	800	806	812	818	823	829	835	841	846	
56	852	858	864	869	875	881	887	892	898	904	
57	910	915	921	927	933	938	944	950	955	961	
58	967	973	978	984	990	996	*001	*007	*013	*018	
59	88 024	030	036	041	047	053	058	064	070	076	
760	081	087	093	098	104	110	116	121	127	133	
61	138	144	150	156	161	167	173	178	184	190	
62	195	201	207	213	218	224	230	235	241	247	
63	252	258	264	270	275	281	287	292	298	304	
64	309	315	321	326	332	338	343	349	355	360	
65	366	372	377	383	389	395	400	406	412	417	
66	423	429	434	440	446	451	457	463	468	474	
67	480	485	491	497	502	508	513	519	525	530	
68	536	542	547	553	559	564	570	576	581	587	
69	593	598	604	610	615	621	627	632	638	643	
770	649	655	660	666	672	677	683	689	694	700	
71	705	711	717	722	728	734	739	745	750	756	
72	762	767	773	779	784	790	795	801	807	812	
73	818	824	829	835	840	846	852	857	863	868	
74	874	880	885	891	897	902	908	913	919	925	
75	930	936	941	947	953	958	964	969	975	981	
76	986	992	997	*003	*009	*014	*020	*025	*031	*037	
77	89 042	048	053	059	064	070	076	081	087	092	
78	098	104	109	115	120	126	131	137	143	148	
79	154	159	165	170	176	182	187	193	198	204	
780	209	215	221	226	232	237	243	248	254	260	
81	265	271	276	282	287	293	298	304	310	315	
82	321	326	332	337	343	348	354	360	365	371	
83	376	382	387	393	398	404	409	415	421	426	
84	432	437	443	448	454	459	465	470	476	481	
85	487	492	498	504	509	515	520	526	531	537	
86	542	548	553	559	564	570	575	581	586	592	
87	597	603	609	614	620	625	631	636	642	647	
88	653	658	664	669	675	680	686	691	697	702	
89	708	713	719	724	730	735	741	746	752	757	
790	763	768	774	779	785	790	796	801	807	812	
91	818	823	829	834	840	845	851	856	862	867	
92	873	878	883	889	894	900	905	911	916	922	
93	927	933	938	944	949	955	960	966	971	977	
94	982	988	993	998	*004	*009	*015	*020	*026	*031	
95	90 037	042	048	053	059	064	069	075	080	086	
96	091	097	102	108	113	119	124	129	135	140	
97	146	151	157	162	168	173	179	184	189	195	
98	200	206	211	217	222	227	233	238	244	249	
99	255	260	266	271	276	282	287	293	298	304	
800	309	314	320	325	331	336	342	347	352	358	
N.	0	1	2	3	4	5	6	7	8.	9	Prop. Pts.

Prop. Pts.

	6	5
1	0.6	0.5
2	1.2	1.0
3	1.8	1.5
4	2.4	2.0
5	3.0	2.5
6	3.6	3.0
7	4.2	3.5
8	4.8	4.0
9	5.4	4.5

N.	0	1	2	3	4	5	6	7	8	9
800	90 309	314	320	325	331	336	342	347	352	358
01	363	369	374	380	385	390	396	401	407	412
02	417	423	428	434	439	445	450	455	461	466
03	472	477	482	488	493	499	504	509	515	520
04	526	531	536	542	547	553	558	563	569	574
05	580	585	590	596	601	607	612	617	623	628
06	634	639	644	650	655	660	666	671	677	682
07	687	693	698	703	709	714	720	725	730	736
08	741	747	752	757	763	768	773	779	784	789
09	795	800	806	811	816	822	827	832	838	843
810	849	854	859	865	870	875	881	886	891	897
11	902	907	913	918	924	929	934	940	945	950
12	956	961	966	972	977	982	988	993	998	*004
13	91 009	014	020	025	030	036	041	046	052	057
14	062	068	073	078	084	089	094	100	105	110
15	116	121	126	132	137	142	148	153	158	164
16	169	174	180	185	190	196	201	206	212	217
17	222	228	233	238	243	249	254	259	265	270
18	275	281	286	291	297	302	307	312	318	323
19	328	334	339	344	350	355	360	365	371	376
820	381	387	392	397	403	408	413	418	424	429
21	434	440	445	450	455	461	466	471	477	482
22	487	492	498	503	508	514	519	524	529	535
23	540	545	551	556	561	566	572	577	582	587
24	593	598	603	609	614	619	624	630	635	640
25	645	651	656	661	666	672	677	682	687	693
26	698	703	709	714	719	724	730	735	740	745
27	751	756	761	766	772	777	782	787	793	798
28	803	808	814	819	824	829	834	840	845	850
29	855	861	866	871	876	882	887	892	897	903
830	908	913	918	924	929	934	939	944	950	955
31	960	965	971	976	981	986	991	997	*002	*007
32	92 012	018	023	028	033	038	044	049	054	059
33	065	070	075	080	085	091	096	101	106	111
34	117	122	127	132	137	143	148	153	158	163
35	169	174	179	184	189	195	200	205	210	215
36	221	226	231	236	241	247	252	257	262	267
37	273	278	283	288	293	298	304	309	314	319
38	324	330	335	340	345	350	355	361	366	371
39	376	381	387	392	397	402	407	412	418	423
840	428	433	438	443	449	454	459	464	469	474
41	480	485	490	495	500	505	511	516	521	526
42	531	536	542	547	552	557	562	567	572	578
43	583	588	593	598	603	609	614	619	624	629
44	634	639	645	650	655	660	665	670	675	681
45	686	691	696	701	706	711	716	722	727	732
46	737	742	747	752	758	763	768	773	778	783
47	788	793	799	804	809	814	819	824	829	834
48	840	845	850	855	860	865	870	875	881	886
49	891	896	901	906	911	916	921	927	932	937
850	942	947	952	957	962	967	973	978	983	988
N.	0	1	2	3	4	5	6	7	8	9

Prop. Pts.

	6	5
1	0.6	0.5
2	1.2	1.0
3	1.8	1.5
4	2.4	2.0
5	3.0	2.5
6	3.6	3.0
7	4.2	3.5
8	4.8	4.0
9	5.4	4.5

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
850	92 942	947	952	957	962	957	973	978	983	988	
51	993	998	*003	*008	*013	*018	*024	*029	*034	*039	
52	93 044	049	054	059	064	069	075	080	085	090	
53	095	100	105	110	115	120	125	131	136	141	
54	146	151	156	161	166	171	176	181	186	192	
55	197	202	207	212	217	222	227	232	237	242	
56	247	252	258	263	268	273	278	283	288	293	
57	298	303	308	313	318	323	328	334	339	344	
58	349	354	359	364	369	374	379	384	389	394	
59	399	404	409	414	420	425	430	435	440	445	
860	450	455	460	465	470	475	480	485	490	495	
61	500	505	510	515	520	526	531	536	541	546	
62	551	556	561	566	571	576	581	586	591	596	
63	601	606	611	616	621	626	631	636	641	646	
64	651	656	661	666	671	676	682	687	692	697	
65	702	707	712	717	722	727	732	737	742	747	
66	752	757	762	767	772	777	782	787	792	797	
67	802	807	812	817	822	827	832	837	842	847	
68	852	857	862	867	872	877	882	887	892	897	
69	902	907	912	917	922	927	932	937	942	947	
870	952	957	962	967	972	977	982	987	992	997	
71	94 002	007	012	017	022	027	032	037	042	047	
72	052	057	062	067	072	077	082	086	091	096	
73	101	106	111	116	121	126	131	136	141	146	
74	151	156	161	166	171	176	181	186	191	196	
75	201	206	211	216	221	226	231	236	240	245	
76	250	255	260	265	270	275	280	285	290	295	
77	300	305	310	315	320	325	330	335	340	345	
78	349	354	359	364	369	374	379	384	389	394	
79	399	404	409	414	419	424	429	433	438	443	
880	448	453	458	463	468	473	478	483	488	493	
81	498	503	507	512	517	522	527	532	537	542	
82	547	552	557	562	567	571	576	581	586	591	
83	596	601	606	611	616	621	626	630	635	640	
84	645	650	655	660	665	670	675	680	685	689	
85	694	699	704	709	714	719	724	729	734	738	
86	743	748	753	758	763	768	773	778	783	787	
87	792	797	802	807	812	817	822	827	832	836	
88	841	846	851	856	861	866	871	876	880	885	
89	890	895	900	905	910	915	919	924	929	934	
890	939	944	949	954	959	963	968	973	978	983	
91	988	993	998	*002	*007	*012	*017	*022	*027	*032	
92	95 036	041	046	051	056	061	066	071	075	080	
93	085	090	095	100	105	109	114	119	124	129	
94	134	139	143	148	153	158	163	168	173	177	
95	182	187	192	197	202	207	211	216	221	226	
96	231	236	240	245	250	255	260	265	270	274	
97	279	284	289	294	299	303	308	313	318	323	
98	328	332	337	342	347	352	357	361	366	371	
99	376	381	386	390	395	400	405	410	415	419	
900	424	429	434	439	444	448	453	458	463	468	
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

Prop. Pts.

	6	5	4
1	0.6	0.5	0.4
2	1.2	1.0	0.8
3	1.8	1.5	1.2
4	2.4	2.0	1.6
5	3.0	2.5	2.0
6	3.6	3.0	2.4
7	4.2	3.5	2.8
8	4.8	4.0	3.2
9	5.4	4.5	3.6

N.	0	1	2	3	4	5	6	7	8	9
900	95 424	429	434	439	444	448	453	458	463	468
01	472	477	482	487	492	497	501	506	511	516
02	521	525	530	535	540	545	550	554	559	564
03	569	574	578	583	588	593	598	602	607	612
04	617	622	626	631	636	641	646	650	655	660
05	665	670	674	679	684	689	694	698	703	708
06	713	718	722	727	732	737	742	746	751	756
07	761	766	770	775	780	785	789	794	799	804
08	809	813	818	823	828	832	837	842	847	852
09	856	861	866	871	875	880	885	890	895	899
910	904	909	914	·918	923	928	933	938	942	947
11	952	957	961	966	971	976	980	985	990	995
12	999	*004	*009	*014	*019	*023	*028	*033	*038	*042
13	96 047	052	057	061	066	071	076	080	085	090
14	095	099	104	109	114	118	123	128	133	137
15	142	147	152	156	161	166	171	175	180	185
16	190	194	199	204	209	213	218	223	227	232
17	237	242	246	251	256	261	265	270	275	280
18	284	289	294	298	303	308	313	317	322	327
19	332	336	341	346	350	355	360	365	369	374
920	379	384	388	393	398	402	407	412	417	421
21	426	431	435	440	445	450	454	459	464	468
22	473	478	483	487	492	497	501	506	511	515
23	520	525	530	534	539	544	548	553	558	562
24	567	572	577	581	586	591	595	600	605	609
25	614	619	624	628	633	638	642	647	652	656
26	661	666	670	675	680	685	689	694	699	703
27	708	713	717	722	727	731	736	741	745	750
28	755	759	764	769	774	778	783	788	792	797
29	802	806	811	816	820	825	830	834	839	844
930	848	853	858	862	867	872	876	881	886	890
31	895	900	904	909	914	918	923	928	932	937
32	942	946	951	956	960	965	970	974	979	984
33	988	993	997	*002	*007	*011	*016	*021	*025	*030
34	97 035	039	044	049	053	058	063	067	072	077
35	081	086	090	095	100	104	109	114	118	123
36	128	132	137	142	146	151	155	160	165	169
37	174	179	183	188	192	197	202	206	211	216
38	220	225	230	234	239	243	248	253	257	262
39	267	271	276	280	285	290	294	299	304	308
940	313	317	322	327	331	336	340	345	350	354
41	359	364	368	373	377	382	387	391	396	400
42	405	410	414	419	424	428	433	437	442	447
43	451	456	460	465	470	474	479	483	488	493
44	497	502	506	511	516	520	525	529	534	539
45	543	548	552	557	562	566	571	575	580	585
46	589	594	598	603	607	612	617	621	626	630
47	635	640	644	649	653	658	663	667	672	676
48	681	685	690	695	699	704	708	713	717	722
49	727	731	736	740	745	749	754	759	763	768
950	772	777	782	786	791	795	800	804	809	813
N.	0	1	2	3	4	5	6	7	8	9

Prop. Pts.

	5	4
1	0.5	0.4
2	1.0	0.8
3	1.5	1.2
4	2.0	1.6
5	2.5	2.0
6	3.0	2.4
7	3.5	2.8
8	4.0	3.2
9	4.5	3.6

N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.
950	97 772	777	782	786	791	795	800	804	809	813	
51	818	823	827	832	836	841	845	850	855	859	
52	864	868	873	877	882	886	891	896	900	905	
53	909	914	918	923	928	932	937	941	946	950	
54	955	959	964	968	973	978	982	987	991	996	
55	98 000	005	009	014	019	023	028	032	037	041	
56	046	050	055	059	064	068	073	078	082	087	
57	091	096	100	105	109	114	118	123	127	132	
58	137	141	146	150	155	159	164	168	173	177	
59	182	186	191	195	200	204	209	214	218	223	
960	227	232	236	241	245	250	254	259	263	268	
61	272	277	281	286	290	295	299	304	308	313	
62	318	322	327	331	336	340	345	349	354	358	
63	363	367	372	376	381	385	390	394	399	403	
64	408	412	417	421	426	430	435	439	444	448	
65	453	457	462	466	471	475	480	484	489	493	
66	498	502	507	511	516	520	525	529	534	538	
67	543	547	552	556	561	565	570	574	579	583	
68	588	592	597	601	605	610	614	619	623	628	
69	632	637	641	646	650	655	659	664	668	673	
970	677	682	686	691	695	700	704	709	713	717	
71	722	726	731	735	740	744	749	753	758	762	
72	767	771	776	780	784	789	793	798	802	807	
73	811	816	820	825	829	834	838	843	847	851	
74	856	860	865	869	874	878	883	887	892	896	
75	900	905	909	914	918	923	927	932	936	941	
76	945	949	954	958	963	967	972	976	981	985	
77	989	994	998	*003	*007	*012	*016	*021	*025	*029	
78	99 034	038	043	047	052	056	061	065	069	074	
79	078	083	087	092	096	100	105	109	114	118	
980	123	127	131	136	140	145	149	154	158	162	
81	167	171	176	180	185	189	193	198	202	207	
82	211	216	220	224	229	233	238	242	247	251	
83	255	260	264	269	273	277	282	286	291	295	
84	300	304	308	313	317	322	326	330	335	339	
85	344	348	352	357	361	366	370	374	379	383	
86	388	392	396	401	405	410	414	419	423	427	
87	432	436	441	445	449	454	458	463	467	471	
88	476	480	484	489	493	498	502	506	511	515	
89	520	524	528	533	537	542	546	550	555	559	
990	564	568	572	577	581	585	590	594	599	603	
91	607	612	616	621	625	629	634	638	642	647	
92	651	656	660	664	669	673	677	682	686	691	
93	695	699	704	708	712	717	721	726	730	734	
94	739	743	747	752	756	760	765	769	774	778	
95	782	787	791	795	800	804	808	813	817	822	
96	826	830	835	839	843	848	852	856	861	865	
97	870	874	878	883	887	891	896	900	904	909	
98	913	917	922	926	930	935	939	944	948	952	
99	957	961	965	970	974	978	983	987	991	996	
1000	00 000	004	009	013	017	022	026	030	035	039	
N.	0	1	2	3	4	5	6	7	8	9	Prop. Pts.

	5	4
1	0.5	0.4
2	1.0	0.8
3	1.5	1.2
4	2.0	1.6
5	2.5	2.0
6	3.0	2.4
7	3.5	2.8
8	4.0	3.2
9	4.5	3.6
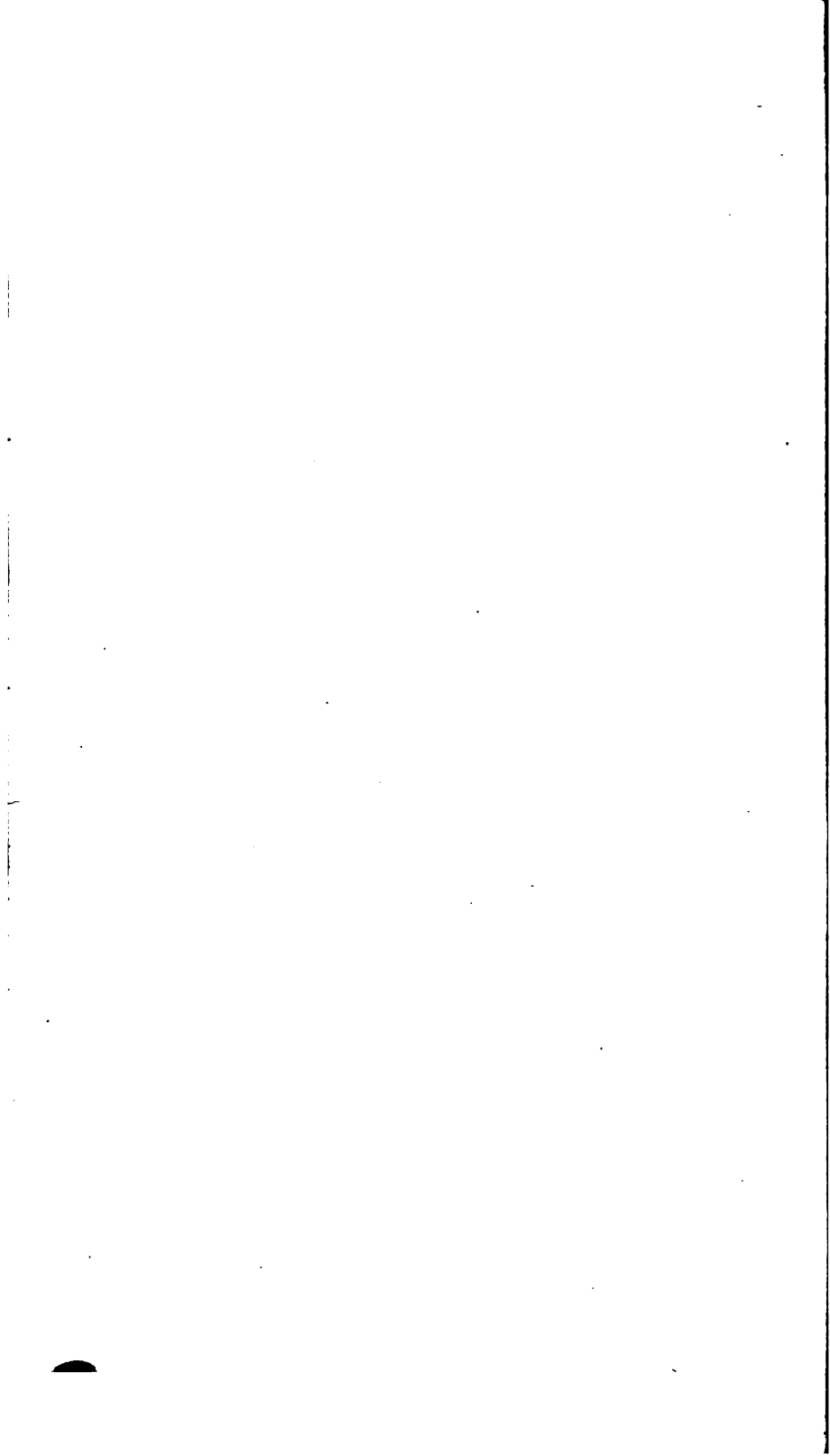
TABLE II

LOGARITHMS

OF THE

TRIGONOMETRIC FUNCTIONS

FOR EACH MINUTE

0°

′	L Sin	d	L Tan	o d	L Cot	L Cos	′
0	....		....		....	0.00 000	60
1	6.46 373		6.46 373		3.53 627	0.00 000	59
2	6.76 476	30103	6.76 476	30103	3.23 524	0.00 000	58
3	6.94 085	17609	6.94 085	17609	3.05 915	0.00 000	57
4	7.06 579	12494	7.06 579	12494	2.93 421	0.00 000	56
5	7.16 270	9691	7.16 270	9691	2.83 730	0.00 000	55
6	7.24 188	7918	7.24 188	7918	2.75 812	0.00 000	54
7	7.30 882	6694	7.30 882	6694	2.69 118	0.00 000	53
8	7.36 682	5800	7.36 682	5800	2.63 318	0.00 000	52
9	7.41 797	5115	7.41 797	5115	2.58 203	0.00 000	51
10	7.46 373	4576	7.46 373	4576	2.53 627	0.00 000	50
11	7.50 512	4139	7.50 512	4139	2.49 488	0.00 000	49
12	7.54 291	3779	7.54 291	3779	2.45 709	0.00 000	48
13	7.57 767	3476	7.57 767	3476	2.42 233	0.00 000	47
14	7.60 985	3218	7.60 986	3219	2.39 014	0.00 000	46
15	7.63 982	2997	7.63 982	2996	2.36 018	0.00 000	45
16	7.66 784	2802	7.66 785	2803	2.33 215	0.00 000	44
17	7.69 417	2633	7.69 418	2633	2.30 582	9.99 999	43
18	7.71 900	2483	7.71 900	2482	2.28 100	9.99 999	42
19	7.74 248	2348	7.74 248	2348	2.25 752	9.99 999	41
20	7.76 475	2227	7.76 476	2228	2.23 524	9.99 999	40
21	7.78 594	2119	7.78 595	2119	2.21 405	9.99 999	39
22	7.80 615	2021	7.80 615	2020	2.19 385	9.99 999	38
23	7.82 545	1930	7.82 546	1931	2.17 454	9.99 999	37
24	7.84 393	1848	7.84 394	1848	2.15 606	9.99 999	36
25	7.86 166	1773	7.86 167	1773	2.13 833	9.99 999	35
26	7.87 870	1704	7.87 871	1704	2.12 129	9.99 999	34
27	7.89 509	1639	7.89 510	1639	2.10 490	9.99 999	33
28	7.91 088	1579	7.91 089	1579	2.08 911	9.99 999	32
29	7.92 612	1524	7.92 613	1524	2.07 387	9.99 998	31
30	7.94 084	1472	7.94 086	1473	2.05 914	9.99 998	30
31	7.95 508	1424	7.95 510	1424	2.04 490	9.99 998	29
32	7.96 887	1379	7.96 889	1379	2.03 111	9.99 998	28
33	7.98 223	1336	7.98 225	1336	2.01 775	9.99 998	27
34	7.99 520	1297	7.99 522	1297	2.00 478	9.99 998	26
35	8.00 779	1259	8.00 781	1259	1.99 219	9.99 998	25
36	8.02 002	1223	8.02 004	1223	1.97 996	9.99 998	24
37	8.03 192	1190	8.03 194	1190	1.96 806	9.99 997	23
38	8.04 350	1158	8.04 353	1159	1.95 647	9.99 997	22
39	8.05 478	1128	8.05 481	1128	1.94 519	9.99 997	21
40	8.06 578	1100	8.06 581	1100	1.93 419	9.99 997	20
41	8.07 650	1072	8.07 653	1072	1.92 347	9.99 997	19
42	8.08 696	1046	8.08 700	1047	1.91 300	9.99 997	18
43	8.09 718	1022	8.09 722	1022	1.90 278	9.99 997	17
44	8.10 717	999	8.10 720	998	1.89 280	9.99 996	16
45	8.11 693	976	8.11 696	976	1.88 304	9.99 996	15
46	8.12 647	954	8.12 651	955	1.87 349	9.99 996	14
47	8.13 581	934	8.13 585	934	1.86 415	9.99 996	13
48	8.14 495	914	8.14 500	915	1.85 500	9.99 996	12
49	8.15 391	896	8.15 395	895	1.84 605	9.99 996	11
50	8.16 268	877	8.16 273	878	1.83 727	9.99 995	10
51	8.17 128	860	8.17 133	860	1.82 867	9.99 995	9
52	8.17 971	843	8.17 976	843	1.82 024	9.99 995	8
53	8.18 798	827	8.18 804	828	1.81 196	9.99 995	7
54	8.19 610	812	8.19 616	812	1.80 384	9.99 995	6
55	8.20 407	797	8.20 413	797	1.79 587	9.99 995	5
56	8.21 189	782	8.21 195	782	1.78 805	9.99 994	4
57	8.21 958	769	8.21 964	769	1.78 036	9.99 994	3
58	8.22 713	755	8.22 720	756	1.77 280	9.99 994	2
59	8.23 456	743	8.23 462	742	1.76 538	9.99 994	1
60	8.24 186	730	8.24 192	730	1.75 808	9.99 993	0
	L Cos	d	L Cot	o d	L Tan	L Sin	′

Prop. Pts.

d	pp1″	d	pp1″
30103	501.72	915	15.25
17609	293.48	914	15.23
12494	208.23	896	14.93
9691	161.52	895	14.92
7918	131.97	878	14.63
6694	111.57	877	14.62
5800	96.67	860	14.33
5115	85.25	843	14.05
4576	76.27	828	13.80
4139	68.98	812	13.53
3779	62.98	797	13.28
3476	57.93	782	13.03
3219	53.65	769	12.82
3218	53.63	756	12.60
2997	49.95	755	12.58
2996	49.93	743	12.38
2803	46.72	742	12.37
2802	46.70	730	12.17
2633	43.88		
2483	41.38		
2482	41.37		
2348	39.13		
2228	37.13		
2227	37.12		
2119	35.32		
2021	33.68		
2020	33.67		
1931	32.18		
1930	32.17		
1848	30.80		
1773	29.55		
1704	28.40		
1639	27.32		
1579	26.32		
1524	25.40		
1473	24.55		
1472	24.53		
1424	23.73		
1379	22.98		
1336	22.27		
1297	21.62		
1259	20.98		
1223	20.38		
1190	19.83		
1158	19.32		
1128	18.80		
1100	18.33		
1072	17.87		
1047	17.45		
1046	17.43		
1022	17.03		
999	16.65		
998	16.63		
976	16.27		
955	15.92		
954	15.90		
934	15.57		

′	L Sin	d	L Tan	o d	L Cot	L Cos		Prop. Pts.			
0	8.24 186	717	8.24 192	718	1.75 808	9.99 993	60				
1	8.24 903	706	8.24 910	706	1.75 090	9.99 993	59				
2	8.25 609	695	8.25 616	696	1.74 384	9.99 993	58				
3	8.26 304	684	8.26 312	684	1.73 688	9.99 993	57				
4	8.26 988	673	8.26 996	673	1.73 004	9.99 992	56				
5	8.27 661	663	8.27 669	663	1.72 331	9.99 992	55				
6	8.28 324	653	8.28 332	654	1.71 668	9.99 992	54				
7	8.28 977	644	8.28 986	643	1.71 014	9.99 992	53				
8	8.29 621	634	8.29 629	634	1.70 371	9.99 992	52				
9	8.30 255	624	8.30 263	625	1.69 737	9.99 991	51				
10	8.30 879	616	8.30 888	617	1.69 112	9.99 991	50	d	pp1″	d	pp1″
11	8.31 495	608	8.31 505	607	1.68 495	9.99 991	49	718	11.97	485	8.08
12	8.32 103	599	8.32 112	599	1.67 888	9.99 990	48	717	11.95	480	8.00
13	8.32 702	590	8.32 711	591	1.67 289	9.99 990	47	706	11.77	475	7.92
14	8.33 292	583	8.33 302	584	1.66 698	9.99 990	46	696	11.60	474	7.90
15	8.33 875	575	8.33 886	575	1.66 114	9.99 990	45	695	11.58	470	7.83
16	8.34 450	568	8.34 461	568	1.65 539	9.99 989	44	684	11.40	464	7.73
17	8.35 018	560	8.35 029	561	1.64 971	9.99 989	43	673	11.22	460	7.67
18	8.35 578	553	8.35 590	553	1.64 410	9.99 989	42	663	11.05	459	7.65
19	8.36 131	547	8.36 143	546	1.63 857	9.99 989	41	654	10.90	455	7.58
20	8.36 678	539	8.36 689	540	1.63 311	9.99 988	40	653	10.88	450	7.50
21	8.37 217	533	8.37 229	533	1.62 771	9.99 988	39	644	10.73	446	7.43
22	8.37 750	526	8.37 762	527	1.62 238	9.99 988	38	643	10.72	445	7.42
23	8.38 276	520	8.38 289	520	1.61 711	9.99 987	37	634	10.57	441	7.35
24	8.38 796	514	8.38 809	514	1.61 191	9.99 987	36	625	10.42	437	7.28
25	8.39 310	508	8.39 323	509	1.60 677	9.99 987	35	624	10.40	436	7.27
26	8.39 818	502	8.39 832	502	1.60 168	9.99 986	34	617	10.28	433	7.22
27	8.40 320	496	8.40 334	496	1.59 666	9.99 986	33	616	10.27	432	7.20
28	8.40 816	491	8.40 830	491	1.59 170	9.99 986	32	608	10.13	428	7.13
29	8.41 307	485	8.41 321	486	1.58 679	9.99 985	31	607	10.12	427	7.12
30	8.41 792	480	8.41 807	480	1.58 193	9.99 985	30	599	9.98	424	7.07
31	8.42 272	474	8.42 287	475	1.57 713	9.99 985	29	591	9.85	420	7.00
32	8.42 746	470	8.42 762	470	1.57 238	9.99 984	28	590	9.83	419	6.98
33	8.43 216	464	8.43 232	464	1.56 768	9.99 984	27	584	9.73	416	6.93
34	8.43 680	459	8.43 696	460	1.56 304	9.99 984	26	583	9.72	412	6.87
35	8.44 139	455	8.44 156	455	1.55 844	9.99 983	25	575	9.58	411	6.85
36	8.44 594	450	8.44 611	450	1.55 389	9.99 983	24	568	9.47	408	6.80
37	8.45 044	445	8.45 061	446	1.54 939	9.99 983	23	561	9.35	404	6.73
38	8.45 489	441	8.45 507	441	1.54 493	9.99 982	22	560	9.33	401	6.68
39	8.45 930	436	8.45 948	437	1.54 052	9.99 982	21	553	9.22	400	6.67
40	8.46 366	433	8.46 385	432	1.53 615	9.99 982	20	547	9.12	397	6.62
41	8.46 799	427	8.46 817	428	1.53 183	9.99 981	19	546	9.10	396	6.60
42	8.47 226	424	8.47 245	424	1.52 755	9.99 981	18	540	9.00	393	6.55
43	8.47 650	419	8.47 669	420	1.52 331	9.99 981	17	539	8.98	390	6.50
44	8.48 069	416	8.48 089	416	1.51 911	9.99 980	16	533	8.88	386	6.43
45	8.48 485	411	8.48 505	412	1.51 495	9.99 980	15	527	8.78	383	6.38
46	8.48 896	408	8.48 917	408	1.51 083	9.99 979	14	526	8.77	382	6.37
47	8.49 304	404	8.49 325	404	1.50 675	9.99 979	13	520	8.67	380	6.33
48	8.49 708	400	8.49 729	401	1.50 271	9.99 979	12	514	8.57	379	6.32
49	8.50 108	396	8.50 130	397	1.49 870	9.99 978	11	509	8.48	376	6.27
50	8.50 504	393	8.50 527	393	1.49 473	9.99 978	10	508	8.47	373	6.22
51	8.50 897	390	8.50 920	390	1.49 080	9.99 977	9	502	8.37	370	6.17
52	8.51 287	386	8.51 310	386	1.48 690	9.99 977	8	496	8.27	369	6.15
53	8.51 673	382	8.51 696	383	1.48 304	9.99 977	7	491	8.18	367	6.12
54	8.52 055	379	8.52 079	380	1.47 921	9.99 976	6	486	8.10	363	6.05
55	8.52 434	376	8.52 459	376	1.47 541	9.99 976	5				
56	8.52 810	373	8.52 835	376	1.47 165	9.99 975	4				
57	8.53 183	369	8.53 208	373	1.46 792	9.99 975	3				
58	8.53 552	367	8.53 578	370	1.46 422	9.99 974	2				
59	8.53 919	363	8.53 945	367	1.46 055	9.99 974	1				
60	8.54 282		8.54 308	363	1.45 692	9.99 974	0				
	L Cos	d	L Cot	o d	L Tan	L Sin	′		Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	
0	8.54 282	360	8.54 308	361	1.45 692	9.99 974	60
1	8.54 642	357	8.54 669	358	1.45 331	9.99 973	59
2	8.54 999	355	8.55 027	355	1.44 973	9.99 973	58
3	8.55 354	351	8.55 382	352	1.44 618	9.99 973	57
4	8.55 705	349	8.55 734	349	1.44 266	9.99 972	56
5	8.56 054	346	8.56 083	346	1.43 917	9.99 971	55
6	8.56 400	343	8.56 429	344	1.43 571	9.99 971	54
7	8.56 743	341	8.56 773	341	1.43 227	9.99 970	53
8	8.57 084	337	8.57 114	338	1.42 886	9.99 970	52
9	8.57 421	336	8.57 452	336	1.42 548	9.99 969	51
10	8.57 757	332	8.57 788	333	1.42 212	9.99 969	50
11	8.58 089	330	8.58 121	330	1.41 879	9.99 968	49
12	8.58 419	328	8.58 451	328	1.41 549	9.99 968	48
13	8.58 747	325	8.58 779	326	1.41 221	9.99 967	47
14	8.59 072	323	8.59 105	323	1.40 895	9.99 967	46
15	8.59 395	320	8.59 428	321	1.40 572	9.99 967	45
16	8.59 715	318	8.59 749	319	1.40 251	9.99 966	44
17	8.60 033	316	8.60 068	316	1.39 932	9.99 966	43
18	8.60 349	313	8.60 384	314	1.39 616	9.99 965	42
19	8.60 662	311	8.60 698	311	1.39 302	9.99 964	41
20	8.60 973	309	8.61 009	310	1.38 991	9.99 964	40
21	8.61 282	307	8.61 319	307	1.38 681	9.99 963	39
22	8.61 589	305	8.61 626	305	1.38 374	9.99 963	38
23	8.61 894	302	8.61 931	303	1.38 069	9.99 962	37
24	8.62 196	301	8.62 234	301	1.37 766	9.99 962	36
25	8.62 497	298	8.62 535	299	1.37 465	9.99 961	35
26	8.62 795	296	8.62 834	297	1.37 166	9.99 961	34
27	8.63 091	294	8.63 131	295	1.36 869	9.99 960	33
28	8.63 385	293	8.63 426	292	1.36 574	9.99 960	32
29	8.63 678	290	8.63 718	291	1.36 282	9.99 959	31
30	8.63 968	288	8.64 009	289	1.35 991	9.99 959	30
31	8.64 256	287	8.64 298	287	1.35 702	9.99 958	29
32	8.64 543	284	8.64 585	285	1.35 415	9.99 958	28
33	8.64 827	283	8.64 870	284	1.35 130	9.99 957	27
34	8.65 110	281	8.65 154	281	1.34 846	9.99 956	26
35	8.65 391	279	8.65 435	280	1.34 565	9.99 956	25
36	8.65 670	277	8.65 715	278	1.34 285	9.99 955	24
37	8.65 947	276	8.65 993	276	1.34 007	9.99 955	23
38	8.66 223	274	8.66 269	274	1.33 731	9.99 954	22
39	8.66 497	272	8.66 543	273	1.33 457	9.99 954	21
40	8.66 769	270	8.66 816	271	1.33 184	9.99 953	20
41	8.67 039	269	8.67 087	269	1.32 913	9.99 952	19
42	8.67 308	267	8.67 356	268	1.32 644	9.99 952	18
43	8.67 575	266	8.67 624	266	1.32 376	9.99 951	17
44	8.67 841	263	8.67 890	264	1.32 110	9.99 950	16
45	8.68 104	263	8.68 154	263	1.31 846	9.99 950	15
46	8.68 367	260	8.68 417	261	1.31 583	9.99 949	14
47	8.68 627	259	8.68 678	260	1.31 322	9.99 949	13
48	8.68 886	258	8.68 938	258	1.31 062	9.99 948	12
49	8.69 144	256	8.69 196	257	1.30 804	9.99 948	11
50	8.69 400	254	8.69 453	255	1.30 547	9.99 947	10
51	8.69 654	253	8.69 708	254	1.30 292	9.99 946	9
52	8.69 907	252	8.69 962	252	1.30 038	9.99 946	8
53	8.70 159	250	8.70 214	251	1.29 786	9.99 945	7
54	8.70 409	249	8.70 465	249	1.29 535	9.99 944	6
55	8.70 658	247	8.70 714	248	1.29 286	9.99 944	5
56	8.70 905	246	8.70 962	246	1.29 038	9.99 943	4
57	8.71 151	244	8.71 208	245	1.28 792	9.99 942	3
58	8.71 395	243	8.71 453	244	1.28 547	9.99 942	2
59	8.71 638	242	8.71 697	243	1.28 303	9.99 941	1
60	8.71 880		8.71 940		1.28 060	9.99 940	0
	L Cos	d	L Cot	c d	L Tan	L Sin	′

Prop. Pts.

d	p p 1″	d	p p 1″
361	6.02	291	4.85
360	6.00	290	4.83
358	5.97	289	4.82
357	5.95	288	4.80
355	5.92	287	4.78
352	5.87	285	4.75
351	5.85	284	4.73
349	5.82	283	4.72
346	5.77	281	4.68
344	5.73	280	4.67
343	5.72	279	4.65
341	5.68	278	4.63
338	5.63	277	4.62
337	5.62	276	4.60
336	5.60	274	4.57
333	5.55	273	4.55
332	5.53	272	4.53
330	5.50	271	4.52
328	5.47	270	4.50
326	5.43	269	4.48
325	5.42	268	4.47
323	5.38	267	4.45
321	5.35	266	4.43
320	5.33	264	4.40
319	5.32	263	4.38
318	5.30	261	4.35
316	5.27	260	4.33
314	5.23	259	4.32
313	5.22	258	4.30
311	5.18	257	4.28
310	5.17	256	4.27
309	5.15	255	4.25
307	5.12	254	4.23
305	5.08	253	4.22
303	5.05	252	4.20
302	5.03	251	4.18
301	5.02	250	4.17
299	4.98	249	4.15
298	4.97	248	4.13
297	4.95	247	4.12
296	4.93	246	4.10
295	4.92	245	4.08
294	4.90	244	4.07
293	4.88	243	4.05
292	4.87	242	4.03

Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	′
0	8.71 880	240	8.71 940	241	1.28 060	9.99 940	60
1	8.72 120		8.72 181		1.27 819	9.99 940	59
2	8.72 359	239	8.72 420	239	1.27 580	9.99 939	58
3	8.72 597	238	8.72 659	239	1.27 341	9.99 938	57
4	8.72 834	237	8.72 896	237	1.27 104	9.99 938	56
5	8.73 069	235	8.73 132	236	1.26 868	9.99 937	55
6	8.73 303	234	8.73 366	234.	1.26 634	9.99 936	54
7	8.73 535	232	8.73 600	234	1.26 400	9.99 936	53
8	8.73 767	232	8.73 832	232	1.26 168	9.99 935	52
9	8.73 997	230	8.74 063	231	1.25 937	9.99 934	51
10	8.74 226	229	8.74 292	229	1.25 708	9.99 934	50
11	8.74 454	228	8.74 521	229	1.25 479	9.99 933	49
12	8.74 680	226	8.74 748	227	1.25 252	9.99 932	48
13	8.74 906	226	8.74 974	226	1.25 026	9.99 932	47
14	8.75 130	224	8.75 199	225	1.24 801	9.99 931	46
15	8.75 353	223	8.75 423	224	1.24 577	9.99 930	45
16	8.75 575	222	8.75 645	222	1.24 355	9.99 929	44
17	8.75 795	220	8.75 867	222	1.24 133	9.99 929	43
18	8.76 015	220	8.76 087	220	1.23 913	9.99 928	42
19	8.76 234	219	8.76 306	219	1.23 694	9.99 927	41
20	8.76 451	217	8.76 525	219	1.23 475	9.99 926	40
21	8.76 667	216	8.76 742	217	1.23 258	9.99 926	39
22	8.76 883	216	8.76 958	216	1.23 042	9.99 925	38
23	8.77 097	214	8.77 173	215	1.22 827	9.99 924	37
24	8.77 310	213	8.77 387	214	1.22 613	9.99 923	36
25	8.77 522	212	8.77 600	213	1.22 400	9.99 923	35
26	8.77 733	211	8.77 811	211	1.22 189	9.99 922	34
27	8.77 943	210	8.78 022	211	1.21 978	9.99 921	33
28	8.78 152	209	8.78 232	210	1.21 768	9.99 920	32
29	8.78 360	208	8.78 441	209	1.21 559	9.99 920	31
30	8.78 568	208	8.78 649	208	1.21 351	9.99 919	30
31	8.78 774	206	8.78 855	206	1.21 145	9.99 918	29
32	8.78 979	205	8.79 061	206	1.20 939	9.99 917	28
33	8.79 183	204	8.79 266	205	1.20 734	9.99 917	27
34	8.79 386	203	8.79 470	204	1.20 530	9.99 916	26
35	8.79 588	202	8.79 673	203	1.20 327	9.99 915	25
36	8.79 789	201	8.79 875	202	1.20 125	9.99 914	24
37	8.79 990	201	8.80 076	201	1.19 924	9.99 913	23
38	8.80 189	199	8.80 277	201	1.19 723	9.99 913	22
39	8.80 388	199	8.80 476	199	1.19 524	9.99 912	21
40	8.80 585	197	8.80 674	198	1.19 326	9.99 911	20
41	8.80 782	197	8.80 872	198	1.19 128	9.99 910	19
42	8.80 978	196	8.81 068	196	1.18 932	9.99 909	18
43	8.81 173	195	8.81 264	196	1.18 736	9.99 909	17
44	8.81 367	194	8.81 459	195	1.18 541	9.99 908	16
45	8.81 560	193	8.81 653	194	1.18 347	9.99 907	15
46	8.81 752	192	8.81 846	193	1.18 154	9.99 906	14
47	8.81 944	192	8.82 038	192	1.17 962	9.99 905	13
48	8.82 134	190	8.82 230	192	1.17 770	9.99 904	12
49	8.82 324	190	8.82 420	190	1.17 580	9.99 904	11
50	8.82 513	189	8.82 610	190	1.17 390	9.99 903	10
51	8.82 701	188	8.82 799	189	1.17 201	9.99 902	9
52	8.82 888	187	8.82 987	188	1.17 013	9.99 901	8
53	8.83 075	187	8.83 175	188	1.16 825	9.99 900	7
54	8.83 261	186	8.83 361	186	1.16 639	9.99 899	6
55	8.83 446	185	8.83 547	186	1.16 453	9.99 898	5
56	8.83 630	184	8.83 732	185	1.16 268	9.99 898	4
57	8.83 813	183	8.83 916	184	1.16 084	9.99 897	3
58	8.83 996	183	8.84 100	184	1.15 900	9.99 896	2
59	8.84 177	181	8.84 282	182	1.15 718	9.99 895	1
60	8.84 358	181	8.84 464	182	1.15 536	9.99 894	0
	L Cos	d	L Cot	c d	L Tan	L Sin	′

Prop. Pts.

d	pp 1″	d	pp 1″
241	4.02	209	3.48
240	4.00	208	3.47
239	3.98	207	3.45
238	3.97	206	3.43
237	3.95	205	3.42
236	3.93	204	3.40
235	3.92	203	3.38
234	3.90	202	3.37
233	3.88	201	3.35
232	3.87	200	3.33
231	3.85	199	3.32
230	3.83	198	3.30
229	3.82	197	3.28
228	3.80	196	3.27
227	3.78	195	3.25
226	3.77	194	3.23
225	3.75	193	3.22
224	3.73	192	3.20
223	3.72	191	3.18
222	3.70	190	3.17
221	3.68	189	3.15
220	3.67	188	3.13
219	3.65	187	3.12
218	3.63	186	3.10
217	3.62	185	3.08
216	3.60	184	3.07
215	3.58	183	3.05
214	3.57	182	3.03
213	3.55	181	3.02
212	3.53		
211	3.52		
210	3.50		

′	L Sin	d	L Tan	c d	L Cot	L Cos			Prop. Pts.
0	8.84 358	181	8.84 464	182	1.15 536	9.99 894	60		
1	8.84 539	181	8.84 646	182	1.15 354	9.99 893	59		
2	8.84 718	179	8.84 826	180	1.15 174	9.99 892	58		
3	8.84 897	179	8.85 006	180	1.14 994	9.99 891	57		
4	8.85 075	178	8.85 185	179	1.14 815	9.99 891	56		
5	8.85 252	177	8.85 363	178	1.14 637	9.99 890	55		
6	8.85 429	177	8.85 540	177	1.14 460	9.99 889	54		
7	8.85 605	176	8.85 717	177	1.14 283	9.99 888	53		
8	8.85 780	175	8.85 893	176	1.14 107	9.99 887	52		
9	8.85 955	175	8.86 069	176	1.13 931	9.99 886	51		
10	8.86 128	173	8.86 243	174	1.13 757	9.99 885	50		
11	8.86 301	173	8.86 417	174	1.13 583	9.99 884	49		
12	8.86 474	173	8.86 591	174	1.13 409	9.99 883	48		
13	8.86 645	171	8.86 763	172	1.13 237	9.99 882	47		d pp 1″
14	8.86 816	171	8.86 935	172	1.13 065	9.99 881	46		182 3.03
15	8.86 987	171	8.87 106	171	1.12 894	9.99 880	45		181 3.02
16	8.87 156	169	8.87 277	171	1.12 723	9.99 879	44		180 3.00
17	8.87 325	169	8.87 447	170	1.12 553	9.99 879	43		179 2.98
18	8.87 494	169	8.87 616	169	1.12 384	9.99 878	42		178 2.97
19	8.87 661	167	8.87 785	169	1.12 215	9.99 877	41		177 2.95
20	8.87 829	168	8.87 953	168	1.12 047	9.99 876	40		176 2.93
21	8.87 995	166	8.88 120	167	1.11 880	9.99 875	39		175 2.92
22	8.88 161	166	8.88 287	167	1.11 713	9.99 874	38		174 2.90
23	8.88 326	165	8.88 453	166	1.11 547	9.99 873	37		173 2.88
24	8.88 490	164	8.88 618	165	1.11 382	9.99 872	36		172 2.87
25	8.88 654	164	8.88 783	165	1.11 217	9.99 871	35		171 2.85
26	8.88 817	163	8.88 948	165	1.11 052	9.99 870	34		170 2.83
27	8.88 980	163	8.89 111	163	1.10 889	9.99 869	33		169 2.82
28	8.89 142	162	8.89 274	163	1.10 726	9.99 868	32		168 2.80
29	8.89 304	162	8.89 437	163	1.10 563	9.99 867	31		167 2.78
30	8.89 464	160	8.89 598	161	1.10 402	9.99 866	30		166 2.77
31	8.89 625	161	8.89 760	162	1.10 240	9.99 865	29		165 2.75
32	8.89 784	159	8.89 920	160	1.10 080	9.99 864	28		164 2.73
33	8.89 943	159	8.90 080	160	1.09 920	9.99 863	27		163 2.72
34	8.90 102	159	8.90 240	160	1.09 760	9.99 862	26		162 2.70
35	8.90 260	158	8.90 399	159	1.09 601	9.99 861	25		161 2.68
36	8.90 417	157	8.90 557	158	1.09 443	9.99 860	24		160 2.67
37	8.90 574	157	8.90 715	158	1.09 285	9.99 859	23		159 2.65
38	8.90 730	156	8.90 872	157	1.09 128	9.99 858	22		158 2.63
39	8.90 885	155	8.91 029	157	1.08 971	9.99 857	21		157 2.62
40	8.91 040	155	8.91 185	156	1.08 815	9.99 856	20		156 2.60
41	8.91 195	155	8.91 340	155	1.08 660	9.99 855	19		155 2.58
42	8.91 349	154	8.91 495	155	1.08 505	9.99 854	18		154 2.57
43	8.91 502	153	8.91 650	155	1.08 350	9.99 853	17		153 2.55
44	8.91 655	153	8.91 803	153	1.08 197	9.99 852	16		152 2.53
45	8.91 807	152	8.91 957	154	1.08 043	9.99 851	15		151 2.52
46	8.91 959	152	8.92 110	153	1.07 890	9.99 850	14		150 2.50
47	8.92 110	151	8.92 262	152	1.07 738	9.99 848	13		149 2.48
48	8.92 261	151	8.92 414	152	1.07 586	9.99 847	12		148 2.47
49	8.92 411	150	8.92 565	151	1.07 435	9.99 846	11		147 2.45
50	8.92 561	150	8.92 716	151	1.07 284	9.99 845	10		146 2.43
51	8.92 710	149	8.92 866	150	1.07 134	9.99 844	9		145 2.42
52	8.92 859	149	8.93 016	150	1.06 984	9.99 843	8		
53	8.93 007	148	8.93 165	149	1.06 835	9.99 842	7		
54	8.93 154	147	8.93 313	148	1.06 687	9.99 841	6		
55	8.93 301	147	8.93 462	149	1.06 538	9.99 840	5		
56	8.93 448	147	8.93 609	147	1.06 391	9.99 839	4		
57	8.93 594	146	8.93 756	147	1.06 244	9.99 838	3		
58	8.93 740	146	8.93 903	147	1.06 097	9.99 837	2		
59	8.93 885	145	8.94 049	146	1.05 951	9.99 836	1		
60	8.94 030	145	8.94 195	146	1.05 805	9.99 834	0		
	L Cos	d	L Cot	c d	L Tan	L Sin	′		Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos		Prop. Pts.
0	8.94 030		8.94 195		1.05 805	9.99 834	60	
1	8.94 147	144	8.94 340	145	1.05 660	9.99 833	59	
2	8.94 317	143	8.94 485	145	1.05 515	9.99 832	58	
3	8.94 461	144	8.94 630	145	1.05 370	9.99 831	57	
4	8.94 603	142	8.94 773	143	1.05 227	9.99 830	56	
5	8.94 746	143	8.94 917	144	1.05 083	9.99 829	55	
6	8.94 887	141	8.95 060	143	1.04 940	9.99 828	54	
7	8.95 029	142	8.95 202	142	1.04 798	9.99 827	53	
8	8.95 170	141	8.95 344	142	1.04 656	9.99 825	52	
9	8.95 310	140	8.95 486	142	1.04 514	9.99 824	51	
10	8.95 450	140	8.95 627	141	1.04 373	9.99 823	50	
11	8.95 589	139	8.95 767	140	1.04 233	9.99 822	49	
12	8.95 728	139	8.95 908	141	1.04 092	9.99 821	48	
13	8.95 867	139	8.96 047	139	1.03 953	9.99 820	47	
14	8.96 005	138	8.96 187	140	1.03 813	9.99 819	46	
15	8.96 143	138	8.96 325	138	1.03 675	9.99 817	45	
16	8.96 280	137	8.96 464	139	1.03 536	9.99 816	44	
17	8.96 417	137	8.96 602	138	1.03 398	9.99 815	43	
18	8.96 553	136	8.96 739	137	1.03 261	9.99 814	42	d	pp1″
19	8.96 689	136	8.96 877	138	1.03 123	9.99 813	41	145	2.42
20	8.96 825	136	8.97 013	136	1.02 987	9.99 812	40	144	2.40
21	8.96 960	135	8.97 150	137	1.02 850	9.99 810	39	143	2.38
22	8.97 095	135	8.97 285	135	1.02 715	9.99 809	38	142	2.37
23	8.97 229	134	8.97 421	136	1.02 579	9.99 808	37	141	2.35
24	8.97 363	134	8.97 556	135	1.02 444	9.99 807	36	140	2.33
25	8.97 496	133	8.97 691	135	1.02 309	9.99 806	35	139	2.32
26	8.97 629	133	8.97 825	134	1.02 175	9.99 804	34	138	2.30
27	8.97 762	133	8.97 959	134	1.02 041	9.99 803	33	137	2.28
28	8.97 894	132	8.98 092	133	1.01 908	9.99 802	32	136	2.27
29	8.98 026	132	8.98 225	133	1.01 775	9.99 801	31	135	2.25
30	8.98 157	131	8.98 358	133	1.01 642	9.99 800	30	134	2.23
31	8.98 288	131	8.98 490	132	1.01 510	9.99 798	29	133	2.22
32	8.98 419	131	8.98 622	132	1.01 378	9.99 797	28	132	2.20
33	8.98 549	130	8.98 753	131	1.01 247	9.99 796	27	131	2.18
34	8.98 679	130	8.98 884	131	1.01 116	9.99 795	26	130	2.17
35	8.98 808	129	8.99 015	131	1.00 985	9.99 793	25	129	2.15
36	8.98 937	129	8.99 145	130	1.00 855	9.99 792	24	128	2.13
37	8.99 066	129	8.99 275	130	1.00 725	9.99 791	23	127	2.12
38	8.99 194	128	8.99 405	130	1.00 595	9.99 790	22	126	2.10
39	8.99 322	128	8.99 534	129	1.00 466	9.99 788	21	125	2.08
40	8.99 450	128	8.99 662	128	1.00 338	9.99 787	20	124	2.07
41	8.99 577	127	8.99 791	129	1.00 209	9.99 786	19	123	2.05
42	8.99 704	127	8.99 919	128	1.00 081	9.99 785	18	122	2.03
43	8.99 830	126	9.00 046	127	0.99 954	9.99 783	17	121	2.02
44	8.99 956	126	9.00 174	128	0.99 826	9.99 782	16	120	2.00
45	9.00 082	126	9.00 301	127	0.99 699	9.99 781	15		
46	9.00 207	125	9.00 427	126	0.99 573	9.99 780	14		
47	9.00 332	125	9.00 553	126	0.99 447	9.99 778	13		
48	9.00 456	124	9.00 679	126	0.99 321	9.99 777	12		
49	9.00 581	125	9.00 805	126	0.99 195	9.99 776	11		
50	9.00 704	123	9.00 930	125	0.99 070	9.99 775	10		
51	9.00 828	124	9.01 055	125	0.98 945	9.99 773	9		
52	9.00 951	123	9.01 179	124	0.98 821	9.99 772	8		
53	9.01 074	123	9.01 303	124	0.98 697	9.99 771	7		
54	9.01 196	122	9.01 427	124	0.98 573	9.99 769	6		
55	9.01 318	122	9.01 550	123	0.98 450	9.99 768	5		
56	9.01 440	122	9.01 673	123	0.98 327	9.99 767	4		
57	9.01 561	121	9.01 796	123	0.98 204	9.99 765	3		
58	9.01 682	121	9.01 918	122	0.98 082	9.99 764	2		
59	9.01 803	121	9.02 040	122	0.97 960	9.99 763	1		
60	9.01 923	120	9.02 162	122	0.97 838	9.99 761	0		
	L Cos	d	L Cot	c d	L Tan	L Sin	′	Prop. Pts.

'	L Sin	d	L Tan	o d	L Cot	L Cos	
0	9.01 923	120	9.02 162	121	0.97 838	9.99 761	60
1	9.02 043	120	9.02 283	121	0.97 717	9.99 760	59
2	9.02 163	120	9.02 404	121	0.97 596	9.99 759	58
3	9.02 283	119	9.02 525	120	0.97 475	9.99 757	57
4	9.02 402	118	9.02 645	121	0.97 355	9.99 756	56
5	9.02 520	119	9.02 766	119	0.97 234	9.99 755	55
6	9.02 639	118	9.02 885	120	0.97 115	9.99 753	54
7	9.02 757	117	9.03 005	119	0.96 995	9.99 752	53
8	9.02 874	118	9.03 124	118	0.96 876	9.99 751	52
9	9.02 992	117	9.03 242	119	0.96 758	9.99 749	51
10	9.03 109	117	9.03 361	118	0.96 639	9.99 748	50
11	9.03 226	116	9.03 479	118	0.96 521	9.99 747	49
12	9.03 342	116	9.03 597	117	0.96 403	9.99 745	48
13	9.03 458	116	9.03 714	118	0.96 286	9.99 744	47
14	9.03 574	116	9.03 832	116	0.96 168	9.99 742	46
15	9.03 690	115	9.03 948	117	0.96 052	9.99 741	45
16	9.03 805	115	9.04 065	116	0.95 935	9.99 740	44
17	9.03 920	114	9.04 181	116	0.95 819	9.99 738	43
18	9.04 034	115	9.04 297	116	0.95 703	9.99 737	42
19	9.04 149	113	9.04 413	115	0.95 587	9.99 736	41
20	9.04 262	114	9.04 528	115	0.95 472	9.99 734	40
21	9.04 376	114	9.04 643	115	0.95 357	9.99 733	39
22	9.04 490	113	9.04 758	115	0.95 242	9.99 731	38
23	9.04 603	112	9.04 873	114	0.95 127	9.99 730	37
24	9.04 715	113	9.04 987	114	0.95 013	9.99 728	36
25	9.04 828	112	9.05 101	113	0.94 899	9.99 727	35
26	9.04 940	112	9.05 214	114	0.94 786	9.99 726	34
27	9.05 052	112	9.05 328	113	0.94 672	9.99 724	33
28	9.05 164	111	9.05 441	112	0.94 559	9.99 723	32
29	9.05 275	111	9.05 553	113	9.94 447	9.99 721	31
30	9.05 380	111	9.05 666	112	0.94 334	9.99 720	30
31	9.05 497	110	9.05 778	112	0.94 222	9.99 718	29
32	9.05 607	110	9.05 890	112	0.94 110	9.99 717	28
33	9.05 717	110	9.06 002	111	0.93 998	9.99 716	27
34	9.05 827	110	9.06 113	111	0.93 887	9.99 714	26
35	9.05 937	109	9.06 224	111	0.93 776	9.99 713	25
36	9.06 046	109	9.06 335	110	0.93 665	9.99 711	24
37	9.06 155	109	9.06 445	111	0.93 555	9.99 710	23
38	9.06 264	108	9.06 556	110	0.93 444	9.99 708	22
39	9.06 372	109	9.06 666	109	0.93 334	9.99 707	21
40	9.06 481	108	9.06 775	110	0.93 225	9.99 705	20
41	9.06 589	107	9.06 885	109	0.93 115	9.99 704	19
42	9.06 696	108	9.06 994	109	0.93 006	9.99 702	18
43	9.06 804	107	9.07 103	108	0.92 897	9.99 701	17
44	9.06 911	107	9.07 211	109	0.92 789	9.99 699	16
45	9.07 018	106	9.07 320	108	0.92 680	9.99 698	15
46	9.07 124	107	9.07 428	108	0.92 572	9.99 696	14
47	9.07 231	106	9.07 536	107	0.92 464	9.99 695	13
48	9.07 337	105	9.07 643	108	0.92 357	9.99 693	12
49	9.07 442	106	9.07 751	107	0.92 249	9.99 692	11
50	9.07 548	105	9.07 858	106	0.92 142	9.99 690	10
51	9.07 653	105	9.07 964	107	0.92 036	9.99 689	9
52	9.07 758	105	9.08 071	106	0.91 929	9.99 687	8
53	9.07 863	105	9.08 177	106	0.91 823	9.99 686	7
54	9.07 968	104	9.08 283	106	0.91 717	9.99 684	6
55	9.08 072	104	9.08 389	106	0.91 611	9.99 683	5
56	9.08 176	104	9.08 495	105	0.91 505	9.99 681	4
57	9.08 280	103	9.08 600	105	0.91 400	9.99 680	3
58	9.08 383	103	9.08 705	105	0.91 295	9.99 678	2
59	9.08 486	103	9.08 810	104	0.91 190	9.99 677	1
60	9.08 589		9.08 914		0.91 086	9.99 675	0

Prop. Pts.

	121	120	119
6	12.1	12.0	11.9
7	14.1	14.0	13.9
8	16.1	16.0	15.9
9	18.2	18.0	17.8
10	20.2	20.0	19.8
20	40.3	40.0	39.7
30	60.5	60.0	59.5
40	80.7	80.0	79.3
50	100.8	100.0	99.2

	118	117	116
6	11.8	11.7	11.6
7	13.8	13.6	13.5
8	15.7	15.6	15.5
9	17.7	17.6	17.4
10	19.7	19.5	19.3
20	39.3	39.0	38.7
30	59.0	58.5	58.0
40	78.7	78.0	77.3
50	98.3	97.5	96.7

	115	114	113
6	11.5	11.4	11.3
7	13.4	13.3	13.2
8	15.3	15.2	15.1
9	17.2	17.1	17.0
10	19.2	19.0	18.8
20	38.3	38.0	37.7
30	57.5	57.0	56.5
40	76.7	76.0	75.3
50	95.8	95.0	94.2

	112	111	110
6	11.2	11.1	11.0
7	13.1	13.0	12.8
8	14.9	14.8	14.7
9	16.8	16.6	16.5
10	18.7	18.5	18.3
20	37.3	37.0	36.7
30	56.0	55.5	55.0
40	74.7	74.0	73.3
50	93.3	92.5	91.7

	109	108	107
6	10.9	10.8	10.7
7	12.7	12.6	12.5
8	14.5	14.4	14.3
9	16.4	16.2	16.0
10	18.2	18.0	17.8
20	36.3	36.0	35.7
30	54.5	54.0	53.5
40	72.7	72.0	71.3
50	90.8	90.0	89.2

	106	105	104
6	10.6	10.5	10.4
7	12.4	12.3	12.1
8	14.1	14.0	13.9
9	15.9	15.8	15.6
10	17.7	17.5	17.3
20	35.3	35.0	34.7
30	53.0	52.5	52.0
40	70.7	70.0	69.3
50	88.3	87.5	86.7

L Cos	d	L Cot	c d	L Tan	L Sin	'	Prop. Pts.

´	L Sin	d	L Tan	c d	L Cot	L Cos		Prop. Pts.
0	9.08 589	103	9.08 914	105	0.91 086	9.99 675	60	
1	9.08 692	103	9.09 019	104	0.90 981	9.99 674	59	**105 104 103**
2	9.08 795	102	9.09 123	104	0.90 877	9.99 672	58	6 10.5 10.4 10.3
3	9.08 897	102	9.09 227	103	0.90 773	9.99 670	57	7 12.3 12.1 12.0
4	9.08 999	102	9.09 330	104	0.90 670	9.99 669	56	8 14.0 13.9 13.7
5	9.09 101	101	9.09 434	103	0.90 566	9.99 667	55	9 15.8 15.6 15.4
6	9.09 202	102	9.09 537	103	0.90 463	9.99 666	54	10 17.5 17.3 17.2
7	9.09 304	101	9.09 640	102	0.90 360	9.99 664	53	20 35.0 34.7 34.3
8	9.09 405	101	9.09 742	103	0.90 258	9.99 663	52	30 52.5 52.0 51.5
9	9.09 506	100	9.09 845	102	0.90 155	9.99 661	51	40 70.0 69.3 68.7
10	9.09 606	101	9.09 947	102	0.90 053	9.99 659	50	50 87.5 86.7 85.8
11	9.09 707	100	9.10 049	101	0.89 951	9.99 658	49	**102 101 100**
12	9.09 807	100	9.10 150	102	0.89 850	9.99 656	48	6 10.2 10.1 10.0
13	9.09 907	99	9.10 252	101	0.89 748	9.99 655	47	7 11.9 11.8 11.7
14	9.10 006	100	9.10 353	101	0.89 647	9.99 653	46	8 13.6 13.5 13.3
15	9.10 106	99	9.10 454	101	0.89 546	9.99 651	45	9 15.3 15.2 15.0
16	9.10 205	99	9.10 555	101	0.89 445	9.99 650	44	10 17.0 16.8 16.7
17	9.10 304	98	9.10 656	100	0.89 344	9.99 648	43	20 34.0 33.7 33.3
18	9.10 402	99	9.10 756	100	0.89 244	9.99 647	42	30 51.0 50.5 50.0
19	9.10 501	98	9.10 856	100	0.89 144	9.99 645	41	40 68.0 67.3 66.7
20	9.10 599	98	9.10 956	100	0.89 044	9.99 643	40	50 85.0 84.2 83.3
21	9.10 697	98	9.11 056	99	0.88 944	9.99 642	39	**99 98 97**
22	9.10 795	98	9.11 155	99	0.88 845	9.99 640	38	6 9.9 9.8 9.7
23	9.10 893	97	9.11 254	99	0.88 746	9.99 638	37	7 11.6 11.4 11.3
24	9.10 990	97	9.11 353	99	0.88 647	9.99 637	36	8 13.2 13.1 12.9
25	9.11 087	97	9.11 452	99	0.88 548	9.99 635	35	9 14.8 14.7 14.6
26	9.11 184	97	9.11 551	98	0.88 449	9.99 633	34	10 16.5 16.3 16.2
27	9.11 281	96	9.11 649	98	0.88 351	9.99 632	33	20 33.0 32.7 32.3
28	9.11 377	97	9.11 747	98	0.88 253	9.99 630	32	30 49.5 49.0 48.5
29	9.11 474	96	9.11 845	98	0.88 155	9.99 629	31	40 66.0 65.3 64.7
30	9.11 570	96	9.11 943	97	0.88 057	9.99 627	30	50 82.5 81.7 80.8
31	9.11 666	95	9.12 040	98	0.87 960	9.99 625	29	**96 95 94**
32	9.11 761	96	9.12 138	97	0.87 862	9.99 624	28	6 9.6 9.5 9.4
33	9.11 857	95	9.12 235	97	0.87 765	9.99 622	27	7 11.2 11.1 11.0
34	9.11 952	95	9.12 332	96	0.87 668	9.99 620	26	8 12.8 12.7 12.5
35	9.12 047	95	9.12 428	97	0.87 572	9.99 618	25	9 14.4 14.2 14.1
36	9.12 142	94	9.12 525	96	0.87 475	9.99 617	24	10 16.0 15.8 15.7
37	9.12 236	95	9.12 621	96	0.87 379	9.99 615	23	20 32.0 31.7 31.3
38	9.12 331	94	9.12 717	96	0.87 283	9.99 613	22	30 48.0 47.5 47.0
39	9.12 425	94	9.12 813	96	0.87 187	9.99 612	21	40 64.0 63.3 62.7
40	9.12 519	93	9.12 909	95	0.87 091	9.99 610	20	50 80.0 79.2 78.3
41	9.12 612	94	9.13 004	95	0.86 996	9.99 608	19	**93 92 91**
42	9.12 706	93	9.13 099	95	0.86 901	9.99 607	18	6 9.3 9.2 9.1
43	9.12 799	93	9.13 194	95	0.86 806	9.99 605	17	7 10.9 10.7 10.6
44	9.12 892	93	9.13 289	95	0.86 711	9.99 603	16	8 12.4 12.3 12.1
45	9.12 985	93	9.13 384	94	0.86 616	9.99 601	15	9 14.0 13.8 13.6
46	9.13 078	93	9.13 478	95	0.86 522	9.99 600	14	10 15.5 15.3 15.2
47	9.13 171	92	9.13 573	94	0.86 427	9.99 598	13	20 31.0 30.7 30.3
48	9.13 263	92	9.13 667	94	0.86 333	9.99 596	12	30 46.5 46.0 45.5
49	9.13 355	92	9.13 761	93	0.86 239	9.99 595	11	40 62.0 61.3 60.7
50	9.13 447	92	9.13 854	94	0.86 146	9.99 593	10	50 77.5 76.7 75.8
51	9.13 539	91	9.13 948	93	0.86 052	9.99 591	9	**90 2 1**
52	9.13 630	92	9.14 041	93	0.85 959	9.99 589	8	6 9.0 0.2 0.1
53	9.13 722	91	9.14 134	93	0.85 866	9.99 588	7	7 10.5 0.2 0.1
54	9.13 813	91	9.14 227	93	0.85 773	9.99 586	6	8 12.0 0.3 0.1
55	9.13 904	90	9.14 320	92	0.85 680	9.99 584	5	9 13.5 0.3 0.2
56	9.13 994	91	9.14 412	92	0.85 588	9.99 582	4	10 15.0 0.3 0.2
57	9.14 085	90	9.14 504	93	0.85 496	9.99 581	3	20 30.0 0.7 0.3
58	9.14 175	91	9.14 597	91	0.85 403	9.99 579	2	30 45.0 1.0 0.5
59	9.14 266	90	9.14 688	92	0.85 312	9.99 577	1	40 60.0 1.3 0.7
60	9.14 356		9.14 780		0.85 220	9.99 575	0	50 75.0 1.7 0.8
	L Cos	d	L Cot	c d	L Tan	L Sin	´	Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	
0	9.14 356	89	9.14 780	92	0.85 220	9.99 575	60
1	9.14 445		9.14 872		0.85 128	9.99 574	59
2	9.14 535	90	9.14 963	91	0.85 037	9.99 572	58
3	9.14 624	89	9.15 054	91	0.84 946	9.99 570	57
4	9.14 714	90	9.15 145	91	0.84 855	9.99 568	56
5	9.14 803	89	9.15 236	91	0.84 764	9.99 566	55
6	9.14 891	88	9.15 327	91	0.84 673	9.99 565	54
7	9.14 980	89	9.15 417	90	0.84 583	9.99 563	53
8	9.15 069	89	9.15 508	91	0.84 492	9.99 561	52
9	9.15 157	88	9.15 598	90	0.84 402	9.99 559	51
10	9.15 245	88	9.15 688	90	0.84 312	9.99 557	50
11	9.15 333	88	9.15 777	89	0.84 223	9.99 556	49
12	9.15 421	87	9.15 867	90	0.84 133	9.99 554	48
13	9.15 508	88	9.15 956	89	0.84 044	9.99 552	47
14	9.15 596	87	9.16 046	90	0.83 954	9.99 550	46
15	9.15 683	87	9.16 135	89	0.83 865	9.99 548	45
16	9.15 770	87	9.16 224	89	0.83 776	9.99 546	44
17	9.15 857	87	9.16 312	89	0.83 688	9.99 545	43
18	9.15 944	86	9.16 401	88	0.83 599	9.99 543	42
19	9.16 030	86	9.16 489	88	0.83 511	9.99 541	41
20	9.16 116	87	9.16 577	88	0.83 423	9.99 539	40
21	9.16 203	86	9.16 665	88	0.83 335	9.99 537	39
22	9.16 289	85	9.16 753	88	0.83 247	9.99 535	38
23	9.16 374	86	9.16 841	87	0.83 159	9.99 533	37
24	9.16 460	85	9.16 928	88	0.83 072	9.99 532	36
25	9.16 545	86	9.17 016	87	0.82 984	9.99 530	35
26	9.16 631	85	9.17 103	87	0.82 897	9.99 528	34
27	9.16 716	85	9.17 190	87	0.82 810	9.99 526	33
28	9.16 801	85	9.17 277	86	0.82 723	9.99 524	32
29	9.16 886	84	9.17 363	87	0.82 637	9.99 522	31
30	9.16 970	85	9.17 450	86	0.82 550	9.99 520	30
31	9.17 055	84	9.17 536	86	0.82 464	9.99 518	29
32	9.17 139	84	9.17 622	86	0.82 378	9.99 517	28
33	9.17 223	84	9.17 708	86	0.82 292	9.99 515	27
34	9.17 307	84	9.17 794	86	0.82 206	9.99 513	26
35	9.17 391	83	9.17 880	85	0.82 120	9.99 511	25
36	9.17 474	84	9.17 965	86	0.82 035	9.99 509	24
37	9.17 558	83	9.18 051	85	0.81 949	9.99 507	23
38	9.17 641	83	9.18 136	85	0.81 864	9.99 505	22
39	9.17 724	83	9.18 221	85	0.81 779	9.99 503	21
40	9.17 807	83	9.18 306	85	0.81 694	9.99 501	20
41	9.17 890	83	9.18 391	84	0.81 609	9.99 499	19
42	9.17 973	82	9.18 475	85	0.81 525	9.99 497	18
43	9.18 055	82	9.18 560	84	0.81 440	9.99 495	17
44	9.18 137	83	9.18 644	84	0.81 356	9.99 494	16
45	9.18 220	82	9.18 728	84	0.81 272	9.99 492	15
46	9.18 302	81	9.18 812	84	0.81 188	9.99 490	14
47	9.18 383	82	9.18 896	83	0.81 104	9.99 488	13
48	9.18 465	82	9.18 979	84	0.81 021	9.99 486	12
49	9.18 547	81	9.19 063	83	0.80 937	9.99 484	11
50	9.18 628	81	9.19 146	83	0.80 854	9.99 482	10
51	9.18 709	81	9.19 229	83	0.80 771	9.99 480	9
52	9.18 790	81	9.19 312	83	0.80 688	9.99 478	8
53	9.18 871	81	9.19 395	83	0.80 605	9.99 476	7
54	9.18 952	81	9.19 478	83	0.80 522	9.99 474	6
55	9.19 033	80	9.19 561	82	0.80 439	9.99 472	5
56	9.19 113	80	9.19 643	82	0.80 357	9.99 470	4
57	9.19 193	80	9.19 725	82	0.80 275	9.99 468	3
58	9.19 273	80	9.19 807	82	0.80 193	9.99 466	2
59	9.19 353	80	9.19 889	82	0.80 111	9.99 464	1
60	9.19 433		9.19 971		0.80 029	9.99 462	0

| | L Cos | d | L Cot | o d | L Tan | L Sin | ′ |

Prop. Pts.

	92	91	90
6	9.2	9.1	9.0
7	10.7	10.6	10.5
8	12.3	12.1	12.0
9	13.8	13.6	13.5
10	15.3	15.2	15.0
20	30.7	30.3	30.0
30	46.0	45.5	45.0
40	61.3	60.7	60.0
50	76.7	75.8	75.0

	89	88	87
6	8.9	8.8	8.7
7	10.4	10.3	10.1
8	11.9	11.7	11.6
9	13.4	13.2	13.1
10	14.8	14.7	14.5
20	29.7	29.3	29.0
30	44.5	44.0	43.5
40	59.3	58.7	58.0
50	74.2	73.3	72.5

	86	85	84
6	8.6	8.5	8.4
7	10.0	9.9	9.8
8	11.5	11.3	11.2
9	12.9	12.8	12.6
10	14.3	14.2	14.0
20	28.7	28.3	28.0
30	43.0	42.5	42.0
40	57.3	56.7	56.0
50	71.7	70.8	70.0

	83	82	81
6	8.3	8.2	8.1
7	9.7	9.6	9.5
8	11.1	10.9	10.8
9	12.5	12.3	12.2
10	13.8	13.7	13.5
20	27.7	27.3	27.0
30	41.5	41.0	40.5
40	55.3	54.7	54.0
50	69.2	68.3	67.5

	80	2	1
6	8.0	0.2	0.1
7	9.3	0.2	0.1
8	10.7	0.3	0.1
9	12.0	0.3	0.2
10	13.3	0.3	0.2
20	26.7	0.7	0.3
30	40.0	1.0	0.5
40	53.3	1.3	0.7
50	66.7	1.7	0.8

Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos		Prop. Pts.
0	9.19 433	80	9.19 971	82	0.80 029	9.99 462	60	
1	9.19 513	79	9.20 053	81	0.79 947	9.99 460	59	
2	9.19 592	80	9.20 134	82	0.79 866	9.99 458	58	
3	9.19 672	79	9.20 216	81	0.79 784	9.99 456	57	
4	9.19 751	79	9.20 297	81	0.79 703	9.99 454	56	
5	9.19 830	79	9.20 378	81	0.79 622	9.99 452	55	
6	9.19 909	79	9.20 459	81	0.79 541	9.99 450	54	
7	9.19 988	79	9.20 540	81	0.79 460	9.99 448	53	
8	9.20 067	78	9.20 621	80	0.79 379	9.99 446	52			80	79	78	77
9	9.20 145	78	9.20 701	81	0.79 299	9.99 444	51	6	8.0	7.9	7.8	7.7
10	9.20 223	79	9.20 782	80	0.79 218	9.99 442	50	7	9.3	9.2	9.1	9.0
11	9.20 302	78	9.20 862	80	0.79 138	9.99 440	49	8	10.7	10.5	10.4	10.3
12	9.20 380	78	9.20 942	80	0.79 058	9.99 438	48	9	12.0	11.9	11.7	11.6
13	9.20 458	77	9.21 022	80	0.78 978	9.99 436	47	10	13.3	13.2	13.0	12.8
14	9.20 535	78	9.21 102	80	0.78 898	9.99 434	46	20	26.7	26.3	26.0	25.7
15	9.20 613	78	9.21 182	79	0.78 818	9.99 432	45	30	40.0	39.5	39.0	38.5
16	9.20 691	77	9.21 261	80	0.78 739	9.99 429	44	40	53.3	52.7	52.0	51.3
17	9.20 768	77	9.21 341	79	0.78 659	9.99 427	43	50	66.7	65.8	65.0	64.2
18	9.20 845	77	9.21 420	79	0.78 580	9.99 425	42	
19	9.20 922	77	9.21 499	79	0.78 501	9.99 423	41	
20	9.20 999	77	9.21 578	79	0.78 422	9.99 421	40	
21	9.21 076	77	9.21 657	79	0.78 343	9.99 419	39	
22	9.21 153	76	9.21 736	78	0.78 264	9.99 417	38	
23	9.21 229	77	9.21 814	79	0.78 186	9.99 415	37	
24	9.21 306	76	9.21 893	78	0.78 107	9.99 413	36	
25	9.21 382	76	9.21 971	78	0.78 029	9.99 411	35			76	75	74	73
26	9.21 458	76	9.22 049	78	0.77 951	9.99 409	34	6	7.6	7.5	7.4	7.3
27	9.21 534	76	9.22 127	78	0.77 873	9.99 407	33	7	8.9	8.8	8.6	8.5
28	9.21 610	75	9.22 205	78	0.77 795	9.99 404	32	8	10.1	10.0	9.9	9.7
29	9.21 685	76	9.22 283	78	0.77 717	9.99 402	31	9	11.4	11.3	11.1	11.0
30	9.21 761	75	9.22 361	77	0.77 639	9.99 400	30	10	12.7	12.5	12.3	12.2
31	9.21 836	76	9.22 438	78	0.77 562	9.99 396	29	20	25.3	25.0	24.7	24.3
32	9.21 912	75	9.22 516	77	0.77 484	9.99 396	28	30	38.0	37.5	37.0	36.5
33	9.21 987	75	9.22 593	77	0.77 407	9.99 394	27	40	50.7	50.0	49.3	48.7
34	9.22 062	75	9.22 670	77	0.77 330	9.99 392	26	50	63.3	62.5	61.7	60.8
35	9.22 137	75	9.22 747	77	0.77 253	9.99 390	25	
36	9.22 211	74	9.22 824	77	0.77 176	9.99 388	24	
37	9.22 286	75	9.22 901	76	0.77 099	9.99 385	23	
38	9.22 361	75	9.22 977	77	0.77 023	9.99 383	22	
39	9.22 435	74	9.23 054	76	0.76 946	9.99 381	21	
40	9.22 509	74	9.23 130	76	0.76 870	9.99 379	20	
41	9.22 583	74	9.23 206	77	0.76 794	9.99 377	19	
42	9.22 657	74	9.23 283	76	0.76 717	9.99 375	18	
43	9.22 731	74	9.23 359	76	0.76 641	9.99 372	17			72	71	3	2
44	9.22 805	73	9.23 435	75	0.76 565	9.99 370	16	
45	9.22 878	74	9.23 510	76	0.76 490	9.99 368	15	6	7.2	7.1	0.3	0.2
46	9.22 952	73	9.23 586	75	0.76 414	9.99 366	14	7	8.4	8.3	0.4	0.2
47	9.23 025	73	9.23 661	76	0.76 339	9.99 364	13	8	9.6	9.5	0.4	0.3
48	9.23 098	73	9.23 737	75	0.76 263	9.99 362	12	9	10.8	10.7	0.5	0.3
49	9.23 171	73	9.23 812	75	0.76 188	9.99 359	11	10	12.0	11.8	0.5	0.3
50	9.23 244	73	9.23 887	75	0.76 113	9.99 357	10	20	24.0	23.7	1.0	0.7
51	9.23 317	73	9.23 962	75	0.76 038	9.99 355	9	30	36.0	35.5	1.5	1.0
52	9.23 390	72	9.24 037	75	0.75 963	9.99 353	8	40	48.0	47.3	2.0	1.3
53	9.23 462	73	9.24 112	74	0.75 888	9.99 351	7	50	60.0	59.2	2.5	1.7
54	9.23 535	72	9.24 186	75	0.75 814	9.99 348	6	
55	9.23 607	72	0.24 261	74	0.75 739	9.99 346	5	
56	9.23 679	73	9.24 335	75	0.75 665	9.99 344	4	
57	9.23 752	71	9.24 410	74	0.75 590	9.99 342	3	
58	9.23 823	72	9.24 484	74	0.75 516	9.99 340	2	
59	9.23 895	72	9.24 558	74	0.75 442	9.99 337	1	
60	9.23 967		9.24 632		0.75 368	9.99 337	0	
	L Cos	d	L Cot	c d	L Tan	J Sin	′	Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.
0	9.23 967	72	9.24 632	74	0.75 368	9.99 335	2	60	
1	9.24 039	71	9.24 706	73	0.75 294	9.99 333	2	59	
2	9.24 110	71	9.24 779	74	0.75 221	9.99 331	2	58	
3	9.24 181	72	9.24 853	73	0.75 147	9.99 329	3	57	
4	9.24 253	71	9.24 926	74	0.75 074	9.99 326	2	56	
5	9.24 324	71	9.25 000	73	0.75 000	9.99 324	2	55	
6	9.24 395	71	9.25 073	73	0.74 927	9.99 322	3	54	
7	9.24 466	70	9.25 146	73	0.74 854	9.99 319	2	53	
8	9.24 536	70	9.25 219	73	0.74 781	9.99 317	2	52	**74** / **73** / **72**
9	9.24 607	70	9.25 292	73	0.74 708	9.99 315	2	51	6 7.4 / 7.3 / 7.2
10	9.24 677	71	9.25 365	72	0.74 635	9.99 313	3	50	7 8.6 / 8.5 / 8.4
11	9.24 748	70	9.25 437	73	0.74 563	9.99 310	2	49	8 9.9 / 9.7 / 9.6
12	9.24 818	70	9.25 510	72	0.74 490	9.99 308	2	48	9 11.1 / 11.0 / 10.8
13	9.24 888	70	9.25 582	73	0.74 418	9.99 306	2	47	10 12.3 / 12.2 / 12.0
14	9.24 958	70	9.25 655	72	0.74 345	9.99 304	3	46	20 24.7 / 24.3 / 24.0
15	9.25 028	70	9.25 727	72	0.74 273	9.99 301	2	45	30 37.0 / 36.5 / 36.0
16	9.25 098	70	9.25 799	72	0.74 201	9.99 299	2	44	40 49.3 / 48.7 / 48.0
17	9.25 168	69	9.25 871	72	0.74 129	9.99 297	3	43	50 61.7 / 60.8 / 60.0
18	9.25 237	70	9.25 943	72	0.74 057	9.99 294	2	42	
19	9.25 307	69	9.26 015	71	0.73 985	9.99 292	2	41	
20	9.25 376	69	9.26 086	72	0.73 914	9.99 290	2	40	**71** / **70** / **69**
21	9.25 445	69	9.26 158	71	0.73 842	9.99 288	3	39	6 7.1 / 7.0 / 6.9
22	9.25 514	69	9.26 229	72	0.73 771	9.99 285	2	38	7 8.3 / 8.2 / 8.0
23	9.25 583	69	9.26 301	71	0.73 699	9.99 283	2	37	8 9.5 / 9.3 / 9.2
24	9.25 652	69	9.26 372	71	0.73 628	9.99 281	3	36	9 10.7 / 10.5 / 10.4
25	9.25 721	69	9.26 443	71	0.73 557	9.99 278	2	35	10 11.8 / 11.7 / 11.5
26	9.25 790	68	9.26 514	71	0.73 486	9.99 276	2	34	20 23.7 / 23.3 / 23.0
27	9.25 858	69	9.26 585	70	0.73 415	9.99 274	3	33	30 35.5 / 35.0 / 34.5
28	9.25 927	68	9.26 655	71	0.73 345	9.99 271	2	32	40 47.3 / 46.7 / 46.0
29	9.25 995	68	9.26 726	71	0.73 274	9.99 269	2	31	50 59.2 / 58.3 / 57.5
30	9.26 063	68	9.26 797	70	0.73 203	9.99 267	3	30	
31	9.26 131	68	9.26 867	70	0.73 133	9.99 264	2	29	
32	9.26 199	68	9.26 937	71	0.73 063	9.99 262	2	28	**68** / **67** / **66**
33	9.26 267	68	9.27 008	70	0.72 992	9.99 260	3	27	6 6.8 / 6.7 / 6.6
34	9.26 335	68	9.27 078	70	0.72 922	9.99 257	2	26	7 7.9 / 7.8 / 7.7
35	9.26 403	67	9.27 148	70	0.72 852	9.99 255	3	25	8 9.1 / 8.9 / 8.8
36	9.26 470	68	9.27 218	70	0.72 782	9.99 252	2	24	9 10.2 / 10.0 / 9.9
37	9.26 538	67	9.27 288	69	0.72 712	9.99 250	2	23	10 11.3 / 11.2 / 11.0
38	9.26 605	67	9.27 357	70	0.72 643	9.99 248	3	22	20 22.7 / 22.3 / 22.0
39	9.26 672	67	9.27 427	69	0.72 573	9.99 245	2	21	30 34.0 / 33.5 / 33.0
40	9.26 739	67	9.27 496	70	0.72 504	9.99 243	2	20	40 45.3 / 44.7 / 44.0
41	9.26 806	67	9.27 566	69	0.72 434	9.99 241	3	19	50 56.7 / 55.8 / 55.0
42	9.26 873	67	9.27 635	69	0.72 365	9.99 238	2	18	
43	9.26 940	67	9.27 704	69	0.72 296	9.99 236	3	17	
44	9.27 007	66	9.27 773	69	0.72 227	9.99 233	2	16	**65** / **3** / **2**
45	9.27 073	67	9.27 842	69	0.72 158	9.99 231	2	15	6 6.5 / 0.3 / 0.2
46	9.27 140	66	9.27 911	69	0.72 089	9.99 229	3	14	7 7.6 / 0.4 / 0.2
47	9.27 206	67	9.27 980	69	0.72 020	9.99 226	2	13	8 8.7 / 0.4 / 0.3
48	9.27 273	66	9.28 049	68	0.71 951	9.99 224	3	12	9 9.8 / 0.5 / 0.3
49	9.27 339	66	9.28 117	69	0.71 883	9.99 221	2	11	10 10.8 / 0.5 / 0.3
50	9.27 405	66	9.28 186	68	0.71 814	9.99 219	2	10	20 21.7 / 1.0 / 0.7
51	9.27 471	66	9.28 254	69	0.71 746	9.99 217	3	9	30 32.5 / 1.5 / 1.0
52	9.27 537	65	9.28 323	68	0.71 677	9.99 214	2	8	40 43.3 / 2.0 / 1.3
53	9.27 602	66	9.28 391	68	0.71 609	9.99 212	3	7	50 54.2 / 2.5 / 1.7
54	9.27 668	66	9.28 459	68	0.71 541	9.99 209	2	6	
55	9.27 734	65	9.28 527	68	0.71 473	9.99 207	3	5	
56	9.27 799	65	9.28 595	67	0.71 405	9.99 204	2	4	
57	9.27 864	66	9.28 662	68	0.71 338	9.99 202	2	3	
58	9.27 930	65	9.28 730	68	0.71 270	9.99 200	3	2	
59	9.27 995	65	9.28 798	67	0.71 202	9.99 197	2	1	
60	9.28 060		9.28 865		0.71 135	9.99 195		0	
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.		
0	9.28 060	65	9.28 865	68	0.71 135	9.99 195		60			
1	9.28 125	65	9.28 933	67	0.71 067	9.99 192	3	59			
2	9.28 190	64	9.29 000	67	0.71 000	9.99 190	2	58			
3	9.28 254	65	9.29 067	67	0.70 933	9.99 187	3 2	57			
4	9.28 319	65	9.29 134	67	0.70 866	9.99 185		56			
5	9.28 384	64	9.29 201	67	0.70 799	9.99 182	3	55			
6	9.28 448	64	9.29 268	67	0.70 732	9.99 180	2	54			
7	9.28 512	65	9.29 335	67	0.70 665	9.99 177	3	53		68	67	66
8	9.28 577	64	9.29 402	66	0.70 598	9.99 175	2 3	52	6	6.8	6.7	6.6
9	9.28 641	64	9.29 468	67	0.70 532	9.99 172	2	51	7	7.9	7.8	7.7
10	9.28 705	64	9.29 535	66	0.70 465	9.99 170	3	50	8	9.1	8.9	8.8
11	9.28 769	64	9.29 601	67	0.70 399	9.99 167	2	49	9	10.2	10.0	9.9
12	9.28 833	63	9.29 668	66	0.70 332	9.99 165	3	48	10	11.3	11.2	11.0
13	9.28 896	64	9.29 734	66	0.70 266	9.99 162	2	47	20	22.7	22.3	22.0
14	9.28 960	64	9.29 800	66	0.70 200	9.99 160	3	46	30	34.0	33.5	33.0
15	9.29 024	63	9.29 866	66	0.70 134	9.99 157	2	45	40	45.3	44.7	44.0
16	9.29 087	63	9.29 932	66	0.70 068	9.99 155	3	44	50	56.7	55.8	55.0
17	9.29 150	64	9.29 998	66	0.70 002	9.99 152	2	43				
18	9.29 214	63	9.30 064	66	0.69 936	9.99 150	3	42				
19	9.29 277	63	9.30 130	65	0.69 870	9.99 147	2	41		65	64	63
20	9.29 340	63	9.30 195	66	0.69 805	9.99 145	3	40	6	6.5	6.4	6.3
21	9.29 403	63	9.30 261	65	0.69 739	9.99 142	2	39	7	7.6	7.5	7.4
22	9.29 466	63	9.30 326	65	0.69 674	9.99 140	3	38	8	8.7	8.5	8.4
23	9.29 529	62	9.30 391	66	0.69 609	9.99 137	2	37	9	9.8	9.6	9.4
24	9.29 591	63	9.30 457	65	0.69 543	9.99 135	3	36	10	10.8	10.7	10.5
25	9.29 654	62	9.30 522	65	0.69 478	9.99 132	2	35	20	21.7	21.3	21.0
26	9.29 716	63	9.30 587	65	0.69 413	9.99 130	3	34	30	32.5	32.0	31.5
27	9.29 779	62	9.30 652	65	0.69 348	9.99 127	3	33	40	43.3	42.7	42.0
28	9.29 841	62	9.30 717	65	0.69 283	9.99 124	2	32	50	54.2	53.3	52.5
29	9.29 903	63	9.30 782	64	0.69 218	9.99 122	3	31				
30	9.29 966	62	9.30 846	65	0.69 154	9.99 119	2	30		62	61	60
31	9.30 028	62	9.30 911	64	0.69 089	9.99 117	3	29	6	6.2	6.1	6.0
32	9.30 090	61	9.30 975	65	0.69 025	9.99 114	2	28	7	7.2	7.1	7.0
33	9.30 151	62	9.31 040	64	0.68 960	9.99 112	3	27	8	8.3	8.1	8.0
34	9.30 213	62	9.31 104	64	0.68 896	9.99 109	3	26	9	9.3	9.2	9.0
35	9.30 275	61	9.31 168	65	0.68 832	9.99 106	2	25	10	10.3	10.2	10.0
36	9.30 336	62	9.31 233	64	0.68 767	9.99 104	3	24	20	20.7	20.3	20.0
37	9.30 398	61	9.31 297	64	0.68 703	9.99 101	2	23	30	31.0	30.5	30.0
38	9.30 459	62	9.31 361	64	0.68 639	9.99 099	3	22	40	41.3	40.7	40.0
39	9.30 521	61	9.31 425	64	0.68 575	9.99 096	3	21	50	51.7	50.8	50.0
40	9.30 582	61	9.31 489	63	0.68 511	9.99 093	2	20				
41	9.30 643	61	9.31 552	64	0.68 448	9.99 091	3	19				
42	9.30 704	61	9.31 616	63	0.68 384	9.99 088	2	18		59	3	2
43	9.30 765	61	9.31 679	64	0.68 321	9.99 086	3	17	6	5.9	0.3	0.2
44	9.30 826	61	9.31 743	63	0.68 257	9.99 083	3	16	7	6.9	0.4	0.2
45	9.30 887	60	9.31 806	64	0.68 194	9.99 080	2	15	8	7.9	0.4	0.3
46	9.30 947	61	9.31 870	63	0.68 130	9.99 078	3	14	9	8.9	0.5	0.3
47	9.31 008	60	9.31 933	63	0.68 067	9.99 075	3	13	10	9.8	0.5	0.3
48	9.31 068	61	9.31 996	63	0.68 004	9.99 072	2	12	20	19.7	1.0	0.7
49	9.31 129	60	9.32 059	63	0.67 941	9.99 070	3	11	30	29.5	1.5	1.0
50	9.31 189	61	9.32 122	63	0.67 878	9.99 067	3	10	40	39.3	2.0	1.3
51	9.31 250	60	9.32 185	63	0.67 815	9.99 064	3	9	50	49.2	2.5	1.7
52	9.31 310	60	9.32 248	63	0.67 752	9.99 062	2	8				
53	9.31 370	60	9.32 311	62	0.67 689	9.99 059	3	7				
54	9.31 430	60	9.32 373	63	0.67 627	9.99 056	2	6				
55	9.31 490	59	9.32 436	62	0.67 564	9.99 054	3	5				
56	9.31 549	60	9.32 498	63	0.67 502	9.99 051	2	4				
57	9.31 600	60	9.32 561	62	0.67 439	9.99 048	3	3				
58	9.31 669	59	9.32 623	62	0.67 377	9.99 046	2	2				
59	9.31 728	60	9.32 685	62	0.67 315	9.99 043	3	1				
60	9.31 788		9.32 747		0.67 253	9.99 040		0				
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	
0	9.31 788	59	9.32 747	63	0.67 253	9.99 040	2	60
1	9.31 847	59	9.32 810	63	0.67 190	9.99 038	2	59
2	9.31 907	60	9.32 872	62	0.67 128	9.99 035	3	58
3	9.31 966	59	9.32 933	61	0.67 067	9.99 032	3	57
4	9.32 025	59	9.32 995	62	0.67 005	9.99 030	2	56
5	9.32 084	59	9.33 057	62	0.66 943	9.99 027	3	55
6	9.32 143	59	9.33 119	61	0.66 881	9.99 024	3	54
7	9.32 202	59	9.33 180	62	0.66 820	9.99 022	2	53
8	9.32 261	59	9.33 242	61	0.66 758	9.99 019	3	52
9	9.32 319	58	9.33 303	62	0.66 697	9.99 016	3	51
10	9.32 378	59	9.33 365	61	0.66 635	9.99 013	3	50
11	9.32 437	59	9.33 426	61	0.66 574	9.99 011	2	49
12	9.32 495	58	9.33 487	61	0.66 513	9.99 008	3	48
13	9.32 553	58	9.33 548	61	0.66 452	9.99 005	3	47
14	9.32 612	59	9.33 609	61	0.66 391	9.99 002	3	46
15	9.32 670	58	9.33 670	61	0.66 330	9.99 000	2	45
16	9.32 728	58	9.33 731	61	0.66 269	9.98 997	3	44
17	9.32 786	58	9.33 792	61	0.66 208	9.98 994	3	43
18	9.32 844	58	9.33 853	61	0.66 147	9.98 991	3	42
19	9.32 902	58	9.33 913	60	0.66 087	9.98 989	2	41
20	9.32 960	58	9.33 974	61	0.66 026	9.98 986	3	40
21	9.33 018	58	9.34 034	60	0.65 966	9.98 983	3	39
22	9.33 075	57	9.34 095	61	0.65 905	9.98 980	3	38
23	9.33 133	58	9.34 155	60	0.65 845	9.98 978	2	37
24	9.33 190	57	9.34 215	60	0.65 785	9.98 975	3	36
25	9.33 248	58	9.34 276	61	0.65 724	9.98 972	3	35
26	9.33 305	57	9.34 336	60	0.65 664	9.98 969	3	34
27	9.33 362	57	9.34 396	60	0.65 604	9.98 967	2	33
28	9.33 420	58	9.34 456	60	0.65 544	9.98 964	3	32
29	9.33 477	57	9.34 516	60	0.65 484	9.98 961	3	31
30	9.33 534	57	9.34 576	60	0.65 424	9.98 958	3	30
31	9.33 591	57	9.34 635	59	0.65 365	9.98 955	3	29
32	9.33 647	56	9.34 695	60	0.65 305	9.98 953	2	28
33	9.33 704	57	9.34 755	60	0.65 245	9.98 950	3	27
34	9.33 761	57	9.34 814	59	0.65 186	9.98 947	3	26
35	9.33 818	57	9.34 874	60	0.65 126	9.98 944	3	25
36	9.33 874	56	9.34 933	59	0.65 067	9.98 941	3	24
37	9.33 931	57	9.34 992	59	0.65 008	9.98 938	3	23
38	9.33 987	56	9.35 051	59	0.64 949	9.98 936	2	22
39	9.34 043	56	9.35 111	60	0.64 889	9.98 933	3	21
40	9.34 100	57	9.35 170	59	0.64 830	9.98 930	3	20
41	9.34 156	56	9.35 229	59	0.64 771	9.98 927	3	19
42	9.34 212	56	9.35 288	59	0.64 712	9.98 924	3	18
43	9.34 268	56	9.35 347	59	0.64 653	9.98 921	3	17
44	9.34 324	56	9.35 405	58	0.64 595	9.98 919	2	16
45	9.34 380	56	9.35 464	59	0.64 536	9.98 916	3	15
46	9.34 436	56	9.35 523	59	0.64 477	9.98 913	3	14
47	9.34 491	55	9.35 581	58	0.64 419	9.98 910	3	13
48	9.34 547	56	9.35 640	59	0.64 360	9.98 907	3	12
49	9.34 602	55	9.35 698	58	0.64 302	9.98 904	3	11
50	9.34 658	56	9.35 757	59	0.64 243	9.98 901	3	10
51	9.34 713	55	9.35 815	58	0.64 185	9.98 898	3	9
52	9.34 769	56	9.35 873	58	0.64 127	9.98 896	2	8
53	9.34 824	55	9.35 931	58	0.64 069	9.98 893	3	7
54	9.34 879	55	9.35 989	58	0.64 011	9.98 890	3	6
55	9.34 934	55	9.36 047	58	0.63 953	9.98 887	3	5
56	9.34 989	55	9.36 105	58	0.63 895	9.98 884	3	4
57	9.35 044	55	9.36 163	58	0.63 837	9.98 881	3	3
58	9.35 099	55	9.36 221	58	0.63 779	9.98 878	3	2
59	9.35 154	55	9.36 279	57	0.63 721	9.98 875	3	1
60	9.35 209	55	9.36 336	57	0.63 664	9.98 872	3	0
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′

Prop. Pts.

	63	62	61
6	6.3	6.2	6.1
7	7.4	7.2	7.1
8	8.4	8.3	8.1
9	9.4	9.3	9.2
10	10.5	10.3	10.2
20	21.0	20.7	20.3
30	31.5	31.0	30.5
40	42.0	41.3	40.7
50	52.5	51.7	50.8

	60	59	58
6	6.0	5.9	5.8
7	7.0	6.9	6.8
8	8.0	7.9	7.7
9	9.0	8.8	8.7
10	10.0	9.8	9.7
20	20.0	19.7	19.3
30	30.0	29.5	29.0
40	40.0	39.3	38.7
50	50.0	49.2	48.3

	57	56	55
6	5.7	5.6	5.5
7	6.6	6.5	6.4
8	7.6	7.5	7.3
9	8.6	8.4	8.3
10	9.5	9.3	9.2
20	19.0	18.7	18.3
30	28.5	28.0	27.5
40	38.0	37.3	36.7
50	47.5	46.7	45.8

	3	2
6	0.3	0.2
7	0.4	0.2
8	0.4	0.3
9	0.5	0.3
10	0.5	0.3
20	1.0	0.7
30	1.5	1.0
40	2.0	1.3
50	2.5	1.7

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	
0	9.35 209	54	9.36 336	58	0.63 664	9.98 872	3	60
1	9.35 263	55	9.36 394	58	0.63 606	9.98 869	3	59
2	9.35 318	55	9.36 452	57	0.63 548	9.98 867	3	58
3	9.35 373	54	9.36 509	57	0.63 491	9.98 864	3	57
4	9.35 427	54	9.36 566	58	0.63 434	9.98 861	3	56
5	9.35 481	55	9.36 624	57	0.63 376	9.98 858	3	55
6	9.35 536	54	9.36 681	57	0.63 319	9.98 855	3	54
7	9.35 590	54	9.36 738	57	0.63 262	9.98 852	3	53
8	9.35 644	54	9.36 795	57	0.63 205	9.98 849	3	52
9	9.35 698	54	9.36 852	57	0.63 148	9.98 846	3	51
10	9.35 752	54	9.36 909	57	0.63 091	9.98 843	3	50
11	9.35 806	54	9.36 966	57	0.63 034	9.98 840	3	49
12	9.35 860	54	9.37 023	57	0.62 977	9.98 837	3	48
13	9.35 914	54	9.37 080	57	0.62 920	9.98 834	3	47
14	9.35 968	54	9.37 137	56	0.62 863	9.98 831	3	46
15	9.36 022	53	9.37 193	57	0.62 807	9.98 828	3	45
16	9.36 075	54	9.37 250	56	0.62 750	9.98 825	3	44
17	9.36 129	53	9.37 306	57	0.62 694	9.98 822	3	43
18	9.36 182	54	9.37 363	56	0.62 637	9.98 819	3	42
19	9.36 236	53	9.37 419	57	0.62 581	9.98 816	3	41
20	9.36 289	53	9.37 476	56	0.62 524	9.98 813	3	40
21	9.36 342	53	9.37 532	56	0.62 468	9.98 810	3	39
22	9.36 395	54	9.37 588	56	0.62 412	9.98 807	3	38
23	9.36 449	53	9.37 644	56	0.62 356	9.98 804	3	37
24	9.36 502	53	9.37 700	56	0.62 300	9.98 801	3	36
25	9.36 555	53	9.37 756	56	0.62 244	9.98 798	3	35
26	9.36 608	52	9.37 812	56	0.62 188	9.98 795	3	34
27	9.36 660	53	9.37 868	56	0.62 132	9.98 792	3	33
28	9.36 713	53	9.37 924	56	0.62 076	9.98 789	3	32
29	9.36 766	53	9.37 980	56	0.62 020	9.98 786	3	31
30	9.36 819	52	9.38 035	56	0.61 965	9.98 783	3	30
31	9.36 871	53	9.38 091	56	0.61 909	9.98 780	3	29
32	9.36 924	52	9.38 147	55	0.61 853	9.98 777	3	28
33	9.36 976	52	9.38 202	55	0.61 798	9.98 774	3	27
34	9.37 028	53	9.38 257	56	0.61 743	9.98 771	3	26
35	9.37 081	52	9.38 313	55	0.61 687	9.98 768	3	25
36	9.37 133	52	9.38 368	55	0.61 632	9.98 765	3	24
37	9.37 185	52	9.38 423	56	0.61 577	9.98 762	3	23
38	9.37 237	52	9.38 479	55	0.61 521	9.98 759	3	22
39	9.37 289	52	9.38 534	55	0.61 466	9.98 756	3	21
40	9.37 341	52	9.38 589	55	0.61 411	9.98 753	3	20
41	9.37 393	52	9.38 644	55	0.61 356	9.98 750	4	19
42	9.37 445	52	9.38 699	55	0.61 301	9.98 746	3	18
43	9.37 497	52	9.38 754	54	0.61 246	9.98 743	3	17
44	9.37 549	51	9.38 808	55	0.61 192	9.98 740	3	16
45	9.37 600	52	9.38 863	55	0.61 137	9.98 737	3	15
46	9.37 652	51	9.38 918	54	0.61 082	9.98 734	3	14
47	9.37 703	52	9.38 972	55	0.61 028	9.98 731	3	13
48	9.37 755	51	9.39 027	55	0.60 973	9.98 728	3	12
49	9.37 806	52	9.39 082	54	0.60 918	9.98 725	3	11
50	9.37 858	51	9.39 136	54	0.60 864	9.98 722	3	10
51	9.37 909	51	9.39 190	55	0.60 810	9.98 719	4	9
52	9.37 960	51	9.39 245	54	0.60 755	9.98 715	3	8
53	9.38 011	51	9.39 299	54	0.60 701	9.98 712	3	7
54	9.38 062	51	9.39 353	54	0.60 647	9.98 709	3	6
55	9.38 113	51	9.39 407	54	0.60 593	9.98 706	3	5
56	9.38 164	51	9.39 461	54	0.60 539	9.98 703	3	4
57	9.38 215	51	9.39 515	54	0.60 485	9.98 700	3	3
58	9.38 266	51	9.39 569	54	0.60 431	9.98 697	3	2
59	9.38 317	51	9.39 623	54	0.60 377	9.98 694	4	1
60	9.38 368		9.39 677		0.60 323	9.98 690		0

L Cos	d	L Cot	c d	L Tan	L Sin	d	′

Prop. Pts.

	58	57	56
6	5.8	5.7	5.6
7	6.8	6.6	6.5
8	7.7	7.6	7.5
9	8.7	8.6	8.4
10	9.7	9.5	9.3
20	19.3	19.0	18.7
30	29.0	28.5	28.0
40	38.7	38.0	37.3
50	48.3	47.5	46.7

	55	54	53
6	5.5	5.4	5.3
7	6.4	6.3	6.2
8	7.3	7.2	7.1
9	8.3	8.1	8.0
10	9.2	9.0	8.8
20	18.3	18.0	17.7
30	27.5	27.0	26.5
40	36.7	36.0	35.3
50	45.8	45.0	44.2

	52	51	4
6	5.2	5.1	0.4
7	6.1	6.0	0.5
8	6.9	6.8	0.5
9	7.8	7.7	0.6
10	8.7	8.5	0.7
20	17.3	17.0	1.3
30	26.0	25.5	2.0
40	34.7	34.0	2.7
50	43.3	42.5	3.3

	3	2
6	0.3	0.2
7	0.4	0.2
8	0.4	0.3
9	0.5	0.3
10	0.5	0.3
20	1.0	0.7
30	1.5	1.0
40	2.0	1.3
50	2.5	1.7

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.
0	9.38 368	50	9.39 677	54	0.60 323	9.98 690	3	60	
1	9.38 418	50	9.39 731	54	0.60 269	9.98 687	3	59	
2	9.38 469	51	9.39 785	54	0.60 215	9.98 684	3	58	
3	9.38 519	50	9.39 838	53	0.60 162	9.98 681	3	57	
4	9.38 570	51	9.39 892	54	0.60 108	9.98 678	3	56	
5	9.38 620	50	9.39 945	53	0.60 055	9.98 675	3	55	
6	9.38 670	50	9.39 999	54	0.60 001	9.98 671	4	54	
7	9.38 721	51	9.40 052	53	0.59 948	9.98 668	3	53	
8	9.38 771	50	9.40 106	54	0.59 894	9.98 665	3	52	
9	9.38 821	50	9.40 159	53	0.59 841	9.98 662	3	51	
10	9.38 871	50	9.40 212	53	0.59 788	9.98 659	3	50	
11	9.38 921	50	9.40 266	54	0.59 734	9.98 656	4	49	
12	9.38 971	50	9.40 319	53	0.59 681	9.98 652	4	48	
13	9.39 021	50	9.40 372	53	0.59 628	9.98 649	3	47	
14	9.39 071	50	9.40 425	53	0.59 575	9.98 646	3	46	
15	9.39 121	49	9.40 478	53	0.59 522	9.98 643	3	45	
16	9.39 170	50	9.40 531	53	0.59 469	9.98 640	4	44	
17	9.39 220	50	9.40 584	52	0.59 416	9.98 636	3	43	
18	9.39 270	49	9.40 636	53	0.59 364	9.98 633	3	42	
19	9.39 319	50	9.40 689	53	0.59 311	9.98 630	3	41	
20	9.39 369	49	9.40 742	53	0.59 258	9.98 627	4	40	
21	9.39 418	49	9.40 795	52	0.59 205	9.98 623	3	39	
22	9.39 467	50	9.40 847	53	0.59 153	9.98 620	3	38	
23	9.39 517	49	9.40 900	52	0.59 100	9.98 617	3	37	
24	9.39 566	49	9.40 952	53	0.59 048	9.98 614	4	36	
25	9.39 615	49	9.41 005	52	0.58 995	9.98 610	3	35	
26	9.39 664	49	9.41 057	52	0.58 943	9.98 607	3	34	
27	9.39 713	49	9.41 109	52	0.58 891	9.98 604	3	33	
28	9.39 762	49	9.41 161	53	0.58 839	9.98 601	4	32	
29	9.39 811	49	9.41 214	52	0.58 786	9.98 597	3	31	
30	9.39 860	49	9.41 266	52	0.58 734	9.98 594	3	30	
31	9.39 909	49	9.41 318	52	0.58 682	9.98 591	3	29	
32	9.39 958	48	9.41 370	52	0.58 630	9.98 588	4	28	
33	9.40 006	49	9.41 422	52	0.58 578	9.98 584	3	27	
34	9.40 055	48	9.41 474	52	0.58 526	9.98 581	3	26	
35	9.40 103	49	9.41 526	52	0.58 474	9.98 578	4	25	
36	9.40 152	48	9.41 578	51	0.58 422	9.98 574	3	24	
37	9.40 200	49	9.41 629	52	0.58 371	9.98 571	3	23	
38	9.40 249	48	9.41 681	52	0.58 319	9.98 568	3	22	
39	9.40 297	49	9.41 733	51	0.58 267	9.98 565	4	21	
40	9.40 346	48	9.41 784	52	0.58 216	9.98 561	3	20	
41	9.40 394	48	9.41 836	51	0.58 164	9.98 558	3	19	
42	9.40 442	48	9.41 887	52	0.58 113	9.98 555	4	18	
43	9.40 490	48	9.41 939	51	0.58 061	9.98 551	3	17	
44	9.40 538	48	9.41 990	51	0.58 010	9.98 548	3	16	
45	9.40 586	48	9.42 041	52	0.57 959	9.98 545	4	15	
46	9.40 634	48	9.42 093	51	0.57 907	9.98 541	3	14	
47	9.40 682	48	9.42 144	51	0.57 856	9.98 538	3	13	
48	9.40 730	48	9.42 195	51	0.57 805	9.98 535	4	12	
49	9.40 778	47	9.42 246	51	0.57 754	9.98 531	3	11	
50	9.40 825	48	9.42 297	51	0.57 703	9.98 528	3	10	
51	9.40 873	48	9.42 348	51	0.57 652	9.98 525	4	9	
52	9.40 921	47	9.42 399	51	0.57 601	9.98 521	3	8	
53	9.40 968	48	9.42 450	51	0.57 550	9.98 518	3	7	
54	9.41 016	47	9.42 501	51	0.57 499	9.98 515	4	6	
55	9.41 063	48	9.42 552	51	0.57 448	9.98 511	3	5	
56	9.41 111	47	9.42 603	50	0.57 397	9.98 508	3	4	
57	9.41 158	47	9.42 653	51	0.57 347	9.98 505	4	3	
58	9.41 205	47	9.42 704	51	0.57 296	9.98 501	3	2	
59	9.41 252	48	9.42 755	50	0.57 245	9.98 498	4	1	
60	9.41 300		9.42 805		0.57 195	9.98 494		0	
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

Prop. Pts.

	54	53	52
6	5.4	5.3	5.2
7	6.3	6.2	6.1
8	7.2	7.1	6.9
9	8.1	8.0	7.8
10	9.0	8.8	8.7
20	18.0	17.7	17.3
30	27.0	26.5	26.0
40	36.0	35.3	34.7
50	45.0	44.2	43.3

	51	50	49
6	5.1	5.0	4.9
7	6.0	5.8	5.7
8	6.8	6.7	6.5
9	7.7	7.5	7.4
10	8.5	8.3	8.2
20	17.0	16.7	16.3
30	25.5	25.0	24.5
40	34.0	33.3	32.7
50	42.5	41.7	40.8

	48	47
6	4.8	4.7
7	5.6	5.5
8	6.4	6.3
9	7.2	7.0
10	8.0	7.8
20	16.0	15.7
30	24.0	23.5
40	32.0	31.3
50	40.0	39.2

	4	3
6	0.4	0.3
7	0.5	0.4
8	0.5	0.4
9	0.6	0.5
10	0.7	0.5
20	1.3	1.0
30	2.0	1.5
40	2.7	2.0
50	3.3	2.5

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.		
0	9.41 300	47	9.42 805	51	0.57 195	9.98 494	3	60			
1	9.41 347	47	9.42 856	51	0.57 144	9.98 491	3	59			
2	9.41 394	47	9.42 906	50	0.57 094	9.98 488	3	58			
3	9.41 441	47	9.42 957	51	0.57 043	9.98 484	4	57			
4	9.41 488	47	9.43 007	50	0.56 993	9.98 481	3	56		**51**	**50**	**49**
5	9.41 535	47	9.43 057	50	0.56 943	9.98 477	4	55			
6	9.41 582	46	9.43 108	51	0.56 892	9.98 474	3	54	6	5.1	5.0	4.9
7	9.41 628	47	9.43 158	50	0.56 842	9.98 471	4	53	7	6.0	5.8	5.7
8	9.41 675	47	9.43 208	50	0.56 792	9.98 467	3	52	8	6.8	6.7	6.5
9	9.41 722	46	9.43 258	50	0.56 742	9.98 464	4	51	9	7.7	7.5	7.4
10	9.41 768	47	9.43 308	50	0.56 692	9.98 460	3	50	10	8.5	8.3	8.2
11	9.41 815	46	9.43 358	50	0.56 642	9.98 457	4	49	20	17.0	16.7	16.3
12	9.41 861	47	9.43 408	50	0.56 592	9.98 453	3	48	30	25.5	25.0	24.5
13	9.41 908	46	9.43 458	50	0.56 542	9.98 450	3	47	40	34.0	33.3	32.7
14	9.41 954	47	9.43 508	50	0.56 492	9.98 447	4	46	50	42.5	41.7	40.8
15	9.42 001	46	9.43 558	49	0.56 442	9.98 443	3	45			
16	9.42 047	46	9.43 607	50	0.56 393	9.98 440	4	44			
17	9.42 093	47	9.43 657	50	0.56 343	9.98 436	3	43			
18	9.42 140	46	9.43 707	49	0.56 293	9.98 433	4	42			
19	9.42 186	46	9.43 756	50	0.56 244	9.98 429	3	41		**48**	**47**	**46**
20	9.42 232	46	9.43 806	49	0.56 194	9.98 426	4	40			
21	9.42 278	46	9.43 855	50	0.56 145	9.98 422	3	39	6	4.8	4.7	4.6
22	9.42 324	46	9.43 905	49	0.56 095	9.98 419	4	38	7	5.6	5.5	5.4
23	9.42 370	46	9.43 954	50	0.56 046	9.98 415	3	37	8	6.4	6.3	6.1
24	9.42 416	45	9.44 004	49	0.55 996	9.98 412	3	36	9	7.2	7.0	6.9
25	9.42 461	46	9.44 053	49	0.55 947	9.98 409	4	35	10	8.0	7.8	7.7
26	9.42 507	46	9.44 102	49	0.55 898	9.98 405	3	34	20	16.0	15.7	15.3
27	9.42 553	46	9.44 151	50	0.55 849	9.98 402	4	33	30	24.0	23.5	23.0
28	9.42 599	45	9.44 201	49	0.55 799	9.98 398	3	32	40	32.0	31.3	30.7
29	9.42 644	46	9.44 250	49	0.55 750	9.98 395	4	31	50	40.0	39.2	38.3
30	9.42 690	45	9.44 299	49	0.55 701	9.98 391	3	30			
31	9.42 735	46	9.44 348	49	0.55 652	9.98 388	4	29			
32	9.42 781	45	9.44 397	49	0.55 603	9.98 384	3	28		**45**	**44**	
33	9.42 826	46	9.44 446	49	0.55 554	9.98 381	3	27			
34	9.42 872	45	9.44 495	49	0.55 505	9.98 377	4	26	6	4.5	4.4	
35	9.42 917	45	9.44 544	48	0.55 456	9.98 373	3	25	7	5.3	5.1	
36	9.42 962	46	9.44 592	49	0.55 408	9.98 370	4	24	8	6.0	5.9	
37	9.43 008	45	9.44 641	49	0.55 359	9.98 366	3	23	9	6.8	6.6	
38	9.43 053	45	9.44 690	48	0.55 310	9.98 363	4	22	10	7.5	7.3	
39	9.43 098	45	9.44 738	49	0.55 262	9.98 359	3	21	20	15.0	14.7	
40	9.43 143	45	9.44 787	49	0.55 213	9.98 356	4	20	30	22.5	22.0	
41	9.43 188	45	9.44 836	48	0.55 164	9.98 352	3	19	40	30.0	29.3	
42	9.43 233	45	9.44 884	49	0.55 116	9.98 349	4	18	50	37.5	36.7	
43	9.43 278	45	9.44 933	48	0.55 067	9.98 345	3	17			
44	9.43 323	44	9.44 981	48	0.55 019	9.98 342	4	16			
45	9.43 367	45	9.45 029	49	0.54 971	9.98 338	4	15			
46	9.43 412	45	9.45 078	48	0.54 922	9.98 334	3	14			
47	9.43 457	45	9.45 126	48	0.54 874	9.98 331	4	13		**4**	**3**	
48	9.43 502	44	9.45 174	48	0.54 826	9.98 327	3	12			
49	9.43 546	45	9.45 222	49	0.54 778	9.98 324	4	11	6	0.4	0.3	
50	9.43 591	44	9.45 271	48	0.54 729	9.98 320	3	10	7	0.5	0.4	
51	9.43 635	45	9.45 319	48	0.54 681	9.98 317	4	9	8	0.5	0.4	
52	9.43 680	44	9.45 367	48	0.54 633	9.98 313	4	8	9	0.6	0.5	
53	9.43 724	45	9.45 415	48	0.54 585	9.98 309	3	7	10	0.7	0.5	
54	9.43 769	44	9.45 463	48	0.54 537	9.98 306	4	6	20	1.3	1.0	
55	9.43 813	44	9.45 511	48	0.54 489	9.98 302	3	5	30	2.0	1.5	
56	9.43 857	44	9.45 559	47	0.54 441	9.98 299	4	4	40	2.7	2.0	
57	9.43 901	45	9.45 606	48	0.54 394	9.98 295	4	3	50	3.3	2.5	
58	9.43 946	44	9.45 654	48	0.54 346	9.98 291	3	2			
59	9.43 990	44	9.45 702	48	0.54 298	9.98 288	4	1			
60	9.44 034		9.45 750		0.54 250	9.98 284		0			
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	
0	9.44 034		9.45 750	47	0.54 250	9.98 284	3	60
1	9.44 078	44	9.45 797	47	0.54 203	9.98 281	3	59
2	9.44 122	44	9.45 845	48	0.54 155	9.98 277	4	58
3	9.44 166	44	9.45 892	47	0.54 108	9.98 273	4	57
4	9.44 210	44	9.45 940	48	0.54 060	9.98 270	3	56
5	9.44 253	43	9.45 987	47	0.54 013	9.98 266	4	55
6	9.44 297	44	9.46 035	48	0.53 965	9.98 262	4	54
7	9.44 341	44	9.46 082	47	.053 918	9.98 259	3	53
8	9.44 385	44	9.46 130	48	0.53 870	9.98 255	4	52
9	9.44 428	44	9.46 177	47	0.53 823	9.98 251	4	51
10	9.44 472	44	9.46 224	47	0.53 776	9.98 248	3	50
11	9.44 516	44	9.46 271	47	0.53 729	9.98 244	4	49
12	9.44 559	43	9.46 319	48	0.53 681	9.98 240	4	48
13	9.44 602	43	9.46 366	47	0.53 634	9.98 237	3	47
14	9.44 646	44	9.46 413	47	0.53 587	9.98 233	4	46
15	9.44 689	43	9.46 460	47	0.53 540	9.98 229	4	45
16	9.44 733	44	9.46 507	47	0.53 493	9.98 226	3	44
17	9.44 776	43	9.46 554	47	0.53 446	9.98 222	4	43
18	9.44 819	43	9.46 601	47	0.53 399	9.98 218	4	42
19	9.44 862	43	9.46 648	47	0.53 352	9.98 215	3	41
20	9.44 905	43	9.46 694	47	0.53 306	9.98 211	4	40
21	9.44 948	44	9.46 741	47	0.53 259	9.98 207	3	39
22	9.44 992	43	9.46 788	47	0.53 212	9.98 204	4	38
23	9.45 035	43	9.46 835	47	0.53 165	9.98 200	4	37
24	9.45 077	42	9.46 881	46	0.53 119	9.98 196	3	36
25	9.45 120	43	9.46 928	47	0.53 072	9.98 192	4	35
26	9.45 163	43	9.46 975	47	0.53 025	9.98 189	3	34
27	9.45 206	43	9.47 021	46	0.52 979	9.98 185	4	33
28	9.45 249	43	9.47 068	47	0.52 932	9.98 181	4	32
29	9.45 292	42	9.47 114	46	0.52 886	9.98 177	3	31
30	9.45 334	43	9.47 160	47	0.52 840	9.98 174		30
31	9.45 377	42	9.47 207	46	0.52 793	9.98 170	4	29
32	9.45 419	43	9.47 253	46	0.52 747	9.98 166	4	28
33	9.45 462	42	9.47 299	47	0.52 701	9.98 162	3	27
34	9.45 504	43	9.47 346	46	0.52 654	9.98 159	4	26
35	9.45 547	42	9.47 392	46	0.52 608	9.98 155	4	25
36	9.45 589	43	9.47 438	46	0.52 562	9.98 151	4	24
37	9.45 632	42	9.47 484	46	0.52 516	9.98 147	3	23
38	9.45 674	42	9.47 530	46	0.52 470	9.98 144	4	22
39	9.45 716	42	9.47 576	46	0.52 424	9.98 140	4	21
40	9.45 758	43	9.47 622	46	0.52 378	9.98 136		20
41	9.45 801	42	9.47 668	46	0.52 332	9.98 132	3	19
42	9.45 843	42	9.47 714	46	0.52 286	9.98 129	4	18
43	9.45 885	42	9.47 760	46	0.52 240	9.98 125	4	17
44	9.45 927	42	9.47 806	46	0.52 194	9.98 121	4	16
45	9.45 969	42	9.47 852	45	0.52 148	9.98 117	4	15
46	9.46 011	42	9.47 897	46	0.52 103	9.98 113	3	14
47	9.46 053	42	9.47 943	46	0.52 057	9.98 110	4	13
48	9.46 095	41	9.47 989	46	0.52 011	9.98 106	4	12
49	9.46 136	42	9.48 035	45	0.51 965	9.98 102	4	11
50	9.46 178	42	9.48 080	46	0.51 920	9.98 098	4	10
51	9.46 220	42	9.48 126	45	0.51 874	9.98 094	4	9
52	9.46 262	41	9.48 171	46	0.51 829	9.98 090	3	8
53	9.46 303	42	9.48 217	45	0.51 783	9.98 087	4	7
54	9.46 345	41	9.48 262	45	0.51 738	9.98 083	4	6
55	9.46 386	42	9.48 307	46	0.51 693	9.98 079	4	5
56	9.46 428	41	9.48 353	45	0.51 647	9.98 075	4	4
57	9.46 469	42	9.48 398	45	0.51 602	9.98 071	4	3
58	9.46 511	41	9.48 443	46	0.51 557	9.98 067	4	2
59	9.46 552	42	9.48 489	45	0.51 511	9.98 063	3	1
60	9.46 594		9.48 534		0.51 466	9.98 060		0

	L Cos	d	L Cot	c d	L Tan	L Sin	d	′

Prop. Pts.

	48	47	46
6	4.8	4.7	4.6
7	5.6	5.5	5.4
8	6.4	6.3	6.1
9	7.2	7.0	6.9
10	8.0	7.8	7.7
20	16.0	15.7	15.3
30	24.0	23.5	23.0
40	32.0	31.3	30.7
50	40.0	39.2	38.3

	45	44	43
6	4.5	4.4	4.3
7	5.3	5.1	5.0
8	6.0	5.9	5.7
9	6.8	6.6	6.4
10	7.5	7.3	7.2
20	15.0	14.7	14.3
30	22.5	22.0	21.5
40	30.0	29.3	28.7
50	37.5	36.7	35.8

	42	41
6	4.2	4.1
7	4.9	4.8
8	5.6	5.5
9	6.3	6.2
10	7.0	6.8
20	14.0	13.7
30	21.0	20.5
40	28.0	27.3
50	35.0	34.2

	4	3
6	0.4	0.3
7	0.5	0.4
8	0.5	0.4
9	0.6	0.5
10	0.7	0.5
20	1.3	1.0
30	2.0	1.5
40	2.7	2.0
50	3.3	2.5

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	
0	9.46 594		9.48 534		0.51 466	9.98 060		60
1	9.46 635	41	9.48 579	45	0.51 421	9.98 056	4	59
2	9.46 676	41	9.48 624	45	0.51 376	9.98 052	4	58
3	9.46 717	41	9.48 669	45	0.51 331	9.98 048	4	57
4	9.46 758	41	9.48 714	45	0.51 286	9.98 044	4	56
5	9.46 800	42	9.48 759	45	0.51 241	9.98 040	4	55
6	9.46 841	41	9.48 804	45	0.51 196	9.98 036	4	54
7	9.46 882	41	9.48 849	45	0.51 151	9.98 032	4	53
8	9.46 923	41	9.48 894	45	0.51 106	9.98 029	3	52
9	9.46 964	41	9.48 939	45	0.51 061	9.98 025	4	51
10	9.47 005	41	9.48 984	45	0.51 016	9.98 021	4	50
11	9.47 045	40	9.49 029	45	0.50 971	9.98 017	4	49
12	9.47 086	41	9.49 073	44	0.50 927	9.98 013	4	48
13	9.47 127	41	9.49 118	45	0.50 882	9.98 009	4	47
14	9.47 168	41	9.49 163	45	0.50 837	9.98 005	4	46
15	9.47 209	41	9.49 207	44	0.50 793	9.98 001	4	45
16	9.47 249	40	9.49 252	45	0.50 748	9.97 997	4	44
17	9.47 290	41	9.49 296	44	0.50 704	9.97 993	4	43
18	9.47 330	40	9.49 341	45	0.50 659	9.97 989	4	42
19	9.47 371	41	9.49 385	44	0.50 615	9.97 986	3	41
20	9.47 411	40	9.49 430	45	0.50 570	9.97 982	4	40
21	9.47 452	41	9.49 474	44	0.50 526	9.97 978	4	39
22	9.47 492	40	9.49 519	45	0.50 481	9.97 974	4	38
23	9.47 533	41	9.49 563	44	0.50 437	9.97 970	4	37
24	9.47 573	40	9.49 607	44	0.50 393	9.97 966	4	36
25	9.47 613	40	9.49 652	45	0.50 348	9.97 962	4	35
26	9.47 654	41	9.49 696	44	0.50 304	9.97 958	4	34
27	9.47 694	40	9.49 740	44	0.50 260	9.97 954	4	33
28	9.47 734	40	9.49 784	44	0.50 216	9.97 950	4	32
29	9.47 774	40	9.49 828	44	0.50 172	9.97 946	4	31
30	9.47 814	40	9.49 872	44	0.50 128	9.97 942	4	30
31	9.47 854	40	9.49 916	44	0.50 084	9.97 938	4	29
32	9.47 894	40	9.49 960	44	0.50 040	9.97 934	4	28
33	9.47 934	40	9.50 004	44	0.49 996	9.97 930	4	27
34	9.47 974	40	9.50 048	44	0.49 952	9.97 926	4	26
35	9.48 014	40	9.50 092	44	0.49 908	9.97 922	4	25
36	9.48 054	40	9.50 136	44	0.49 864	9.97 918	4	24
37	9.48 094	40	9.50 180	44	0.49 820	9.97 914	4	23
38	9.48 133	39	9.50 223	43	0.49 777	9.97 910	4	22
39	9.48 173	40	9.50 267	44	0.49 733	9.97 906	4	21
40	9.48 213	40	9.50 311	44	0.49 689	9.97 902	4	20
41	9.48 252	39	9.50 355	44	0.49 645	9.97 898	4	19
42	9.48 292	40	9.50 398	43	0.49 602	9.97 894	4	18
43	9.48 332	40	9.50 442	44	0.49 558	9.97 890	4	17
44	9.48 371	39	9.50 485	43	0.49 515	9.97 886	4	16
45	9.48 411	40	9.50 529	44	0.49 471	9.97 882	4	15
46	9.48 450	39	9.50 572	43	0.49 428	9.97 878	4	14
47	9.48 490	40	9.50 616	44	0.49 384	9.97 874	4	13
48	9.48 529	39	9.50 659	43	0.49 341	9.97 870	4	12
49	9.48 568	39	9.50 703	44	0.49 297	9.97 866	4	11
50	9.48 607	39	9.50 746	43	0.49 254	9.97 861	5	10
51	9.48 647	40	9.50 789	43	0.49 211	9.97 857	4	9
52	9.48 686	39	9.50 833	44	0.49 167	9.97 853	4	8
53	9.48 725	39	9.50 876	43	0.49 124	9.97 849	4	7
54	9.48 764	39	9.50 919	43	0.49 081	9.97 845	4	6
55	9.48 803	39	9.50 962	43	0.49 038	9.97 841	4	5
56	9.48 842	39	9.51 005	43	0.48 995	9.97 837	4	4
57	9.48 881	39	9.51 048	44	0.48 952	9.97 833	4	3
58	9.48 920	39	9.51 092	43	0.48 908	9.97 829	4	2
59	9.48 959	39	9.51 135	43	0.48 865	9.97 825	4	1
60	9.48 998	39	9.51 178	43	0.48 822	9.97 821		0
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′

Prop. Pts.

	45	44	43
6	4.5	4.4	4.3
7	5.3	5.1	5.0
8	6.0	5.9	5.7
9	6.8	6.6	6.4
20	15.0	14.7	14.3
30	22.5	22.0	21.5
40	30.0	29.3	28.7
50	37.5	36.7	35.8

	42	41
6	4.2	4.1
7	4.9	4.8
8	5.6	5.5
9	6.3	6.2
10	7.0	6.8
20	14.0	13.7
30	21.0	20.5
40	28.0	27.3
50	35.0	34.2

	40	39
6	4.0	3.9
7	4.7	4.6
8	5.3	5.2
9	6.0	5.9
10	6.7	6.5
20	13.3	13.0
30	20.0	19.5
40	26.7	26.0
50	33.3	32.5

	5	4	3
6	0.5	0.4	0.3
7	0.6	0.5	0.4
8	0.7	0.5	0.4
9	0.8	0.6	0.5
10	0.8	0.7	0.5
20	1.7	1.3	1.0
30	2.5	2.0	1.5
40	3.3	2.7	2.0
50	4.2	3.3	2.5

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.			
0	9.48 998	39	9.51 178	43	0.48 822	9.97 821	4	60				
1	9.49 037	39	9.51 221	43	0.48 779	9.97 817	5	59				
2	9.49 076	39	9.51 264	42	0.48 736	9.97 812	4	58				
3	9.49 115	38	9.51 306	43	0.48 694	9.97 808	4	57				
4	9.49 153	39	9.51 349	43	0.48 651	9.97 804	4	56				
5	9.49 192	39	9.51 392	43	0.48 608	9.97 800	4	55				
6	9.49 231	38	9.51 435	43	0.48 565	9.97 796	4	54				
7	9.49 269	39	9.51 478	42	0.48 522	9.97 792	4	53		43	42	41
8	9.49 308	39	9.51 520	43	0.48 480	9.97 788	4	52				
9	9.49 347	38	9.51 563	43	0.48 437	9.97 784	5	51	6	4.3	4.2	4.1
10	9.49 385	39	9.51 606	42	0.48 394	9.97 779	4	50	7	5.0	4.9	4.8
11	9.49 424	38	9.51 648	43	0.48 352	9.97 775	4	49	8	5.7	5.6	5.5
12	9.49 462	38	9.51 691	43	0.48 309	9.97 771	4	48	9	6.4	6.3	6.2
13	9.49 500	39	9.51 734	42	0.48 266	9.97 767	4	47	10	7.2	7.0	6.8
14	9.49 539	38	9.51 776	43	0.48 224	9.97 763	4	46	20	14.3	14.0	13.7
15	9.49 577	38	9.51 819	42	0.48 181	9.97 759	4	45	30	21.5	21.0	20.5
16	9.49 615	39	9.51 861	42	0.48 139	9.97 754	5	44	40	28.7	28.0	27.3
17	9.49 654	38	9.51 903	43	0.48 097	9.97 750	4	43	50	35.8	35.0	34.2
18	9.49 692	38	9.51 946	42	0.48 054	9.97 746	4	42				
19	9.49 730	38	9.51 988	43	0.48 012	9.97 742	4	41				
20	9.49 768	38	9.52 031	42	0.47 969	9.97 738	4	40				
21	9.49 806	38	9.52 073	42	0.47 927	9.97 734	5	39				
22	9.49 844	38	9.52 115	42	0.47 885	9.97 729	4	38				
23	9.49 882	38	9.52 157	43	0.47 843	9.97 725	4	37				
24	9.49 920	38	9.52 200	42	0.47 800	9.97 721	4	36				
25	9.49 958	38	9.52 242	42	0.47 758	9.97 717	4	35				
26	9.49 996	38	9.52 284	42	0.47 716	9.97 713	5	34		39	38	37
27	9.50 034	38	9.52 326	42	0.47 674	9.97 708	4	33				
28	9.50 072	38	9.52 368	42	0.47 632	9.97 704	4	32	6	3.9	3.8	3.7
29	9.50 110	38	9.52 410	42	0.47 590	9.97 700	4	31	7	4.6	4.4	4.3
30	9.50 148	37	9.52 452	42	0.47 548	9.97 696	5	30	8	5.2	5.1	4.9
31	9.50 185	38	9.52 494	42	0.47 506	9.97 691	4	29	9	5.9	5.7	5.6
32	9.50 223	38	9.52 536	42	0.47 464	9.97 687	4	28	10	6.5	6.3	6.2
33	9.50 261	37	9.52 578	42	0.47 422	9.97 683	4	27	20	13.0	12.7	12.3
34	9.50 298	38	9.52 620	41	0.47 380	9.97 679	5	26	30	19.5	19.0	18.5
35	9.50 336	38	9.52 661	42	0.47 339	9.97 674	4	25	40	26.0	25.3	24.7
36	9.50 374	37	9.52 703	42	0.47 297	9.97 670	4	24	50	32.5	31.7	30.8
37	9.50 411	38	9.52 745	42	0.47 255	9.97 666	4	23				
38	9.50 449	37	9.52 787	42	0.47 213	9.97 662	5	22				
39	9.50 486	37	9.52 829	41	0.47 171	9.97 657	4	21				
40	9.50 523	38	9.52 870	42	0.47 130	9.97 653	4	20				
41	9.50 561	37	9.52 912	41	0.47 088	9.97 649	4	19				
42	9.50 598	37	9.52 953	42	0.47 047	9.97 645	5	18				
43	9.50 635	38	9.52 995	42	0.47 005	9.97 640	4	17		36	5	4
44	9.50 673	37	9.53 037	41	0.46 963	9.97 636	4	16				
45	9.50 710	37	9.53 078	42	0.46 922	9.97 632	4	15	6	3.6	0.5	0.4
46	9.50 747	37	9.53 120	41	0.46 880	9.97 628	5	14	7	4.2	0.6	0.5
47	9.50 784	37	9.53 161	41	0.46 839	9.97 623	4	13	8	4.8	0.7	0.5
48	9.50 821	37	9.53 202	42	0.46 798	9.97 619	4	12	9	5.4	0.8	0.6
49	9.50 858	38	9.53 244	41	0.46 756	9.97 615	5	11	10	6.0	0.8	0.7
50	9.50 896	37	9.53 285	42	0.46 715	9.97 610	4	10	20	12.0	1.7	1.3
51	9.50 933	37	9.53 327	41	0.46 673	9.97 606	4	9	30	18.0	2.5	2.0
52	9.50 970	37	9.53 368	41	0.46 632	9.97 602	4	8	40	24.0	3.3	2.7
53	9.51 007	36	9.53 409	41	0.46 591	9.97 597	5	7	50	30.0	4.2	3.3
54	9.51 043	37	9.53 450	42	0.46 550	9.97 593	4	6				
55	9.51 080	37	9.53 492	41	0.46 508	9.97 589	5	5				
56	9.51 117	37	9.53 533	41	0.46 467	9.97 584	4	4				
57	9.51 154	37	9.53 574	41	0.46 426	9.97 580	4	3				
58	9.51 191	36	9.53 615	41	0.46 385	9.97 576	5	2				
59	9.51 227	37	9.53 656	41	0.46 344	9.97 571	4	1				
60	9.51 264		9.53 697		0.46 303	9.97 567		0				

	L Cos	d	L Cot	c d	L Tan	L Sin	d	′		Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	′
0	9.51 264	37	9.53 697	41	0.46 303	9.97 567	4	60
1	9.51 301	37	9.53 738	41	0.46 262	9.97 563	5	59
2	9.51 338	36	9.53 779	41	0.46 221	9.97 558	4	58
3	9.51 374	37	9.53 820	41	0.46 180	9.97 554	4	57
4	9.51 411	36	9.53 861	41	0.46 139	9.97 550	5	56
5	9.51 447	37	9.53 902	41	0.46 098	9.97 545	4	55
6	9.51 484	36	9.53 943	41	0.46 057	9.97 541	5	54
7	9.51 520	37	9.53 984	41	0.46 016	9.97 536	4	53
8	9.51 557	36	9.54 025	40	0.45 975	9.97 532	4	52
9	9.51 593	36	9.54 065	41	0.45 935	9.97 528	5	51
10	9.51 629	37	9.54 106	41	0.45 894	9.97 523	4	50
11	9.51 666	36	9.54 147	40	0.45 853	9.97 519	4	49
12	9.51 702	36	9.54 187	41	0.45 813	9.97 515	5	48
13	9.51 738	36	9.54 228	41	0.45 772	9.97 510	4	47
14	9.51 774	37	9.54 269	40	0.45 731	9.97 506	5	46
15	9.51 811	36	9.54 309	41	0.45 691	9.97 501	4	45
16	9.51 847	36	9.54 350	40	0.45 650	9.97 497	5	44
17	9.51 883	36	9.54 390	41	0.45 610	9.97 492	4	43
18	9.51 919	36	9.54 431	40	0.45 569	9.97 488	4	42
19	9.51 955	36	9.54 471	41	0.45 529	9.97 484	5	41
20	9.51 991	36	9.54 512	40	0.45 488	9.97 479	4	40
21	9.52 027	36	9.54 552	41	0.45 448	9.97 475	5	39
22	9.52 063	36	9.54 593	40	0.45 407	9.97 470	4	38
23	9.52 099	36	9.54 633	40	0.45 367	9.97 466	5	37
24	9.52 135	36	9.54 673	41	0.45 327	9.97 461	4	36
25	9.52 171	36	9.54 714	40	0.45 286	9.97 457	4	35
26	9.52 207	35	9.54 754	40	0.45 246	9.97 453	5	34
27	9.52 242	36	9.54 794	41	0.45 206	9.97 448	4	33
28	9.52 278	36	9.54 835	40	0.45 165	9.97 444	5	32
29	9.52 314	36	9.54 875	40	0.45 125	9.97 439	4	31
30	9.52 350	35	9.54 915	40	0.45 085	9.97 435	5	30
31	9.52 385	36	9.54 955	40	0.45 045	9.97 430	4	29
32	9.52 421	35	9.54 995	40	0.45 005	9.97 426	5	28
33	9.52 456	36	9.55 035	40	0.44 965	9.97 421	4	27
34	9.52 492	35	9.55 075	40	0.44 925	9.97 417	5	26
35	9.52 527	36	9.55 115	40	0.44 885	9.97 412	4	25
36	9.52 563	35	9.55 155	40	0.44 845	9.97 408	5	24
37	9.52 598	36	9.55 195	40	0.44 805	9.97 403	4	23
38	9.52 634	35	9.55 235	40	0.44 765	9.97 399	5	22
39	9.52 669	36	9.55 275	40	0.44 725	9.97 394	4	21
40	9.52 705	35	9.55 315	40	0.44 685	9.97 390	5	20
41	9.52 740	35	9.55 355	40	0.44 645	9.97 385	4	19
42	9.52 775	36	9.55 395	39	0.44 605	9.97 381	5	18
43	9.52 811	35	9.55 434	40	0.44 566	9.97 376	4	17
44	9.52 846	35	9.55 474	40	0.44 526	9.97 372	5	16
45	9.52 881	35	9.55 514	40	0.44 486	9.97 367	4	15
46	9.52 916	35	9.55 554	39	0.44 446	9.97 363	5	14
47	9.52 951	35	9.55 593	40	0.44 407	9.97 358	5	13
48	9.52 986	35	9.55 633	40	0.44 367	9.97 353	4	12
49	9.53 021	35	9.55 673	39	0.44 327	9.97 349	5	11
50	9.53 056	36	9.55 712	40	0.44 288	9.97 344	4	10
51	9.53 092	34	9.55 752	39	0.44 248	9.97 340	5	9
52	9.53 126	35	9.55 791	40	0.44 209	9.97 335	4	8
53	9.53 161	35	9.55 831	39	0.44 169	9.97 331	5	7
54	9.53 196	35	9.55 870	40	0.44 130	9.97 326	4	6
55	9.53 231	35	9.55 910	39	0.44 090	9.97 322	5	5
56	9.53 266	35	9.55 949	40	0.44 051	9.97 317	5	4
57	9.53 301	35	9.55 989	39	0.44 011	9.97 312	4	3
58	9.53 336	34	9.56 028	39	0.43 972	9.97 308	5	2
59	9.53 370	35	9.56 067	40	0.43 933	9.97 303	4	1
60	9.53 405		9.56 107		0.43 893	9.97 299		0
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′

Prop. Pts.

	41	40	39
6	4.1	4.0	3.9
7	4.8	4.7	4.6
8	5.5	5.3	5.2
9	6.2	6.0	5.9
10	6.8	6.7	6.5
20	13.7	13.3	13.0
30	20.5	20.0	19.5
40	27.3	26.7	26.0
50	34.2	33.3	32.5

	37	36	35
6	3.7	3.6	3.5
7	4.3	4.2	4.1
8	4.9	4.8	4.7
9	5.6	5.4	5.3
10	6.2	6.0	5.8
20	12.3	12.0	11.7
30	18.5	18.0	17.5
40	24.7	24.0	23.3
50	30.8	30.0	29.2

	34	5	4
6	3.4	0.5	0.4
7	4.0	0.6	0.5
8	4.5	0.7	0.5
9	5.1	0.8	0.6
10	5.7	0.8	0.7
20	11.3	1.7	1.3
30	17.0	2.5	2.0
40	22.7	3.3	2.7
50	28.3	4.2	3.3

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.
0	9.53 405	35	9.56 107	39	0.43 893	9.97 299	5	**60**	
1	9.53 440	35	9.56 146	39	0.43 854	9.97 294	5	59	
2	9.53 475	34	9.56 185	39	0.43 815	9.97 289	5	58	
3	9.53 509	35	9.56 224	40	0.43 776	9.97 285	4	57	
4	9.53 544	34	9.56 264	39	0.43 736	9.97 280	4	56	
5	9.53 578	35	9.56 303	39	0.43 697	9.97 276	5	55	
6	9.53 613	34	9.56 342	39	0.43 658	9.97 271	5	54	
7	9.53 647	35	9.56 381	39	0.43 619	9.97 266	4	53	
8	9.53 682	34	9.56 420	39	0.43 580	9.97 262	5	52	**40** / **39** / **38**
9	9.53 716	35	9.56 459	39	0.43 541	9.97 257	5	51	6 4.0 3.9 3.8
10	9.53 751	34	9.56 498	39	0.43 502	9.97 252	4	**50**	7 4.7 4.6 4.4
11	9.53 785	34	9.56 537	39	0.43 463	9.97 248	5	49	8 5.3 5.2 5.1
12	9.53 819	35	9.56 576	39	0.43 424	9.97 243	5	48	9 6.0 5.9 5.7
13	9.53 854	34	9.56 615	39	0.43 385	9.97 238	4	47	10 6.7 6.5 6.3
14	9.53 888	34	9.56 654	39	0.43 346	9.97 234	5	46	20 13.3 13.0 12.7
15	9.53 922	35	9.56 693	39	0.43 307	9.97 229	5	45	30 20.0 19.5 19.0
16	9.53 957	34	9.56 732	39	0.43 268	9.97 224	4	44	40 26.7 26.0 25.3
17	9.53 991	34	9.56 771	39	0.43 229	9.97 220	5	43	50 33.3 32.5 31.7
18	9.54 025	34	9.56 810	39	0.43 190	9.97 215	5	42	
19	9.54 059	34	9.56 849	38	0.43 151	9.97 210	4	41	
20	9.54 093	34	9.56 887	39	0.43 113	9.97 206	5	**40**	
21	9.54 127	34	9.56 926	39	0.43 074	9.97 201	5	39	
22	9.54 161	34	9.56 965	39	0.43 035	9.97 196	4	38	
23	9.54 195	34	9.57 004	38	0.42 996	9.97 192	5	37	
24	9.54 229	34	9.57 042	39	0.42 958	9.97 187	5	36	
25	9.54 263	34	9.57 081	39	0.42 919	9.97 182	4	35	**37** / **35** / **34**
26	9.54 297	34	9.57 120	38	0.42 880	9.97 178	5	34	
27	9.54 331	34	9.57 158	39	0.42 842	9.97 173	5	33	6 3.7 3.5 3.4
28	9.54 365	34	9.57 197	38	0.42 803	9.97 168	5	32	7 4.3 4.1 4.0
29	9.54 399	34	9.57 235	39	0.42 765	9.97 163	4	31	8 4.9 4.7 4.5
30	9.54 433	33	9.57 274	38	0.42 726	9.97 159	5	**30**	9 5.6 5.3 5.1
31	9.54 466	34	9.57 312	39	0.42 688	9.97 154	5	29	10 6.2 5.8 5.7
32	9.54 500	34	9.57 351	38	0.42 649	9.97 149	4	28	20 12.3 11.7 11.3
33	9.54 534	33	9.57 389	39	0.42 611	9.97 145	5	27	30 18.5 17.5 17.0
34	9.54 567	34	9.57 428	38	0.42 572	9.97 140	5	26	40 24.7 23.3 22.7
35	9.54 601	34	9.57 466	38	0.42 534	9.97 135	5	25	50 30.8 29.2 28.3
36	9.54 635	33	9.57 504	39	0.42 496	9.97 130	4	24	
37	9.54 668	34	9.57 543	38	0.42 457	9.97 126	5	23	
38	9.54 702	33	9.57 581	38	0.42 419	9.97 121	5	22	
39	9.54 735	34	9.57 619	39	0.42 381	9.97 116	5	21	
40	9.54 769	33	9.57 658	38	0.42 342	9.97 111	4	**20**	
41	9.54 802	34	9.57 696	38	0.42 304	9.97 107	5	19	
42	9.54 836	33	9.57 734	38	0.42 266	9.97 102	5	18	
43	9.54 869	34	9.57 772	38	0.42 228	9.97 097	5	17	
44	9.54 903	34	9.57 810	39	0.42 190	9.97 092	5	16	**33** / **5** / **4**
45	9.54 937	33	9.57 849	38	0.42 151	9.97 087	4	15	
46	9.54 969	34	9.57 887	38	0.42 113	9.97 083	5	14	6 3.3 0.5 0.4
47	9.55 003	33	9.57 925	38	0.42 075	9.97 078	5	13	7 3.8 0.6 0.5
48	9.55 036	33	9.57 963	38	0.42 037	9.97 073	5	12	8 4.4 0.7 0.5
49	9.55 069	33	9.58 001	38	0.41 999	9.97 068	5	11	9 5.0 0.8 0.6
50	9.55 102	34	9.58 039	38	0.41 961	9.97 063	4	**10**	10 5.5 0.8 0.7
51	9.55 136	33	9.58 077	38	0.41 923	9.97 059	5	9	20 11.0 1.7 1.3
52	9.55 169	33	9.58 115	38	0.41 885	9.97 054	5	8	30 16.5 2.5 2.0
53	9.55 202	33	9.58 153	38	0.41 847	9.97 049	5	7	40 22.0 3.3 2.7
54	9.55 235	33	9.58 191	38	0.41 809	9.97 044	5	6	50 27.5 4.2 3.3
55	9.55 268	33	9.58 229	38	0.41 771	9.97 039	5	5	
56	9.55 301	33	9.58 267	37	0.41 733	9.97 035	5	4	
57	9.55 334	33	9.58 304	38	0.41 696	9.97 030	5	3	
58	9.55 367	33	9.58 342	38	0.41 658	9.97 025	5	2	
59	9.55 400	33	9.58 380	38	0.41 620	9.97 020	5	1	
60	9.55 433		9.58 418		0.41 582	9.97 015		**0**	
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	d			Prop. Pts.		
0	9.55 433	33	9.58 418	37	0.41 582	9.97 015	5	60				
1	9.55 466	33	9.58 455	38	0.41 545	9.97 010	5	59				
2	9.55 499	33	9.58 493	38	0.41 507	9.97 005	5	58				
3	9.55 532	32	9.58 531	38	0.41 469	9.97 001	4	57				
4	9.55 564	33	9.58 569	37	0.41 431	9.96 996	5	56				
5	9.55 597	33	9.58 606	38	0.41 394	9.96 991	5	55				
6	9.55 630	33	9.58 644	37	0.41 356	9.96 986	5	54				
7	9.55 663	33	9.58 681	38	0.41 319	9.96 981	5	53		38	37	36
8	9.55 695	32	9.58 719	38	0.41 281	9.96 976	5	52				
9	9.55 728	33	9.58 757	37	0.41 243	9.96 971	5	51	6	3.8	3.7	3.6
10	9.55 761	33	9.58 794	38	0.41 206	9.96 966	4	50	7	4.4	4.3	4.2
11	9.55 793	32	9.58 832	37	0.41 168	9.96 962	5	49	8	5.1	4.9	4.8
12	9.55 826	33	9.58 869	38	0.41 131	9.96 957	5	48	9	5.7	5.6	5.4
13	9.55 858	32	9.58 907	37	0.41 093	9.96 952	5	47	10	6.3	6.2	6.0
14	9.55 891	33	9.58 944	37	0.41 056	9.96 947	5	46	20	12.7	12.3	12.0
15	9.55 923	33	9.58 981	38	0.41 019	9.96 942	5	45	30	19.0	18.5	18.0
16	9.55 956	32	9.59 019	37	0.40 981	9.96 937	5	44	40	25.3	24.7	24.0
17	9.55 988	33	9.59 056	38	0.40 944	9.96 932	5	43	50	31.7	30.8	30.0
18	9.56 021	32	9.59 094	37	0.40 906	9.96 927	5	42				
19	9.56 053	32	9.59 131	37	0.40 869	9.96 922	5	41				
20	9.56 085	33	9.59 168	37	0.40 832	9.96 917	5	40				
21	9.56 118	32	9.59 205	38	0.40 795	9.96 912	5	39				
22	9.56 150	32	9.59 243	37	0.40 757	9.96 907	4	38				
23	9.56 182	33	9.59 280	37	0.40 720	9.96 903	5	37				
24	9.56 215	32	9.59 317	37	0.40 683	9.96 898	5	36				
25	9.56 247	32	9.59 354	37	0.40 646	9.96 893	5	35		33	32	31
26	9.56 279	32	9.59 391	38	0.40 609	9.96 888	5	34				
27	9.56 311	32	9.59 429	37	0.40 571	9.96 883	5	33	6	3.3	3.2	3.1
28	9.56 343	32	9.59 466	37	0.40 534	9.96 878	5	32	7	3.9	3.7	3.6
29	9.56 375	33	9.59 503	37	0.40 497	9.96 873	5	31	8	4.4	4.3	4.1
30	9.56 408	32	9.59 540	37	0.40 460	9.96 868	5	30	9	5.0	4.8	4.6
31	9.56 440	32	9.59 577	37	0.40 423	9.96 863	5	29	10	5.5	5.3	5.2
32	9.56 472	32	9.59 614	37	0.40 386	9.96 858	5	28	20	11.0	10.7	10.3
33	9.56 504	32	9.59 651	37	0.40 349	9.96 853	5	27	30	16.5	16.0	15.5
34	9.56 536	32	9.59 688	37	0.40 312	9.96 848	5	26	40	22.0	21.3	20.7
35	9.56 568	31	9.59 725	37	0.40 275	9.96 843	5	25	50	27.5	26.7	25.8
36	9.56 599	32	9.59 762	37	0.40 238	9.96 838	5	24				
37	9.56 631	32	9.59 799	36	0.40 201	9.96 833	5	23				
38	9.56 663	32	9.59 835	37	0.40 165	9.96 828	5	22				
39	9.56 695	32	9.59 872	37	0.40 128	9.96 823	5	21				
40	9.56 727	32	9.59 909	37	0.40 091	9.96 818	5	20				
41	9.56 759	31	9.59 946	37	0.40 054	9.96 813	5	19				
42	9.56 790	32	9.59 983	36	0.40 017	9.96 808	5	18				
43	9.56 822	32	9.60 019	37	0.39 981	9.96 803	5	17		6	5	4
44	9.56 854	32	9.60 056	37	0.39 944	9.96 798	5	16				
45	9.56 886	31	9.60 093	37	0.39 907	9.96 793	5	15	6	0.6	0.5	0.4
46	9.56 917	32	9.60 130	36	0.39 870	9.96 788	5	14	7	0.7	0.6	0.5
47	9.56 949	31	9.60 166	37	0.39 834	9.96 783	5	13	8	0.8	0.7	0.5
48	9.56 980	32	9.60 203	37	0.39 797	9.96 778	6	12	9	0.9	0.8	0.6
49	9.57 012	32	9.60 240	36	0.39 760	9.96 772	5	11	10	1.0	0.8	0.7
50	9.57 044	31	9.60 276	37	0.39 724	9.96 767	5	10	20	2.0	1.7	1.3
51	9.57 075	32	9.60 313	36	0.39 687	9.96 762	5	9	30	3.0	2.5	2.0
52	9.57 107	31	9.60 349	37	0.39 651	9.96 757	5	8	40	4.0	3.3	2.7
53	9.57 138	31	9.60 386	36	0.39 614	9.96 752	5	7	50	5.0	4.2	3.3
54	9.57 169	32	9.60 422	37	0.39 578	9.96 747	5	6				
55	9.57 201	31	9.60 459	36	0.39 541	9.96 742	5	5				
56	9.57 232	32	9.60 495	37	0.39 505	9.96 737	5	4				
57	9.57 264	31	9.60 532	36	0.39 468	9.96 732	5	3				
58	9.57 295	31	9.60 568	37	0.39 432	9.96 727	5	2				
59	9.57 326	32	9.60 605	36	0.39 395	9.96 722	5	1				
60	9.57 358		9.60 641		0.39 359	9.96 717		0				
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′		Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.		
0	9.57 358	31	9.60 641	36	0.39 359	9.96 717	6	60			
1	9.57 389	31	9.60 677	37	0.39 323	9.96 711	6	59			
2	9.57 420	31	9.60 714	36	0.39 286	9.96 706	5	58			
3	9.57 451	31	9.60 750	36	0.39 250	9.96 701	5	57			
4	9.57 482	32	9.60 786	37	0.39 214	9.96 696	5	56			
5	9.57 514	31	9.60 823	36	0.39 177	9.96 691	5	55			
6	9.57 545	31	9.60 859	36	0.39 141	9.96 686	5	54			
7	9.57 576	31	9.60 895	35	0.39 105	9.96 681	5	53			
8	9.57 607	31	9.60 931	36	0.39 069	9.96 676	6	52		**37**	**36**	**35**
9	9.57 638	31	9.60 967	37	0.39 033	9.96 670	5	51	6	3.7	3.6	3.5
10	9.57 669	31	9.61 004	36	0.38 996	9.96 665	5	50	7	4.3	4.2	4.1
11	9.57 700	31	9.61 040	36	0.38 960	9.96 660	5	49	8	4.9	4.8	4.7
12	9.57 731	31	9.61 076	36	0.38 924	9.96 655	5	48	9	5.6	5.4	5.3
13	9.57 762	31	9.61 112	36	0.38 888	9.96 650	5	47	10	6.2	6.0	5.8
14	9.57 793	31	9.61 148	36	0.38 852	9.96 645	5	46	20	12.3	12.0	11.7
·15	9.57 824	31	9.61 184	36	0.38 816	9.96 640	6	45	30	18.5	18.0	17.5
16	9.57 855	30	9.61 220	36	c.38 780	9.96 634	5	44	40	24.7	24.0	23.3
17	9.57 885	31	9.61 256	36	0.38 744	9.96 629	5	43	50	30.8	30.0	29.2
18	9.57 916	31	9.61 292	36	0.38 708	9.96 624	5	42			
19	9.57 947	31	9.61 328	36	0.38 672	9.96 619	5	41			
20	9.57 978	30	9.61 364	36	0.38 636	9.96 614	6	40			
21	9.58 008	31	9.61 400	36	0.38 600	9.96 608	5	39			
22	9.58 039	31	9.61 436	36	0.38 564	9.96 603	5	38			
23	9.58 070	31	9.61 472	36	0.38 528	9.96 598	5	37			
24	9.58 101	30	9.61 508	36	0.38 492	9.96 593	5	36			
25	9.58 131	31	9.61 544	35	0.38 456	9.96 588	6	35		**32**	**31**	**30**
26	9.58 162	30	9.61 579	36	0.38 421	9 96 582	5	34	6	3.2	3.1	3.0
27	9.58 192	31	9.61 615	36	0.38 385	9.96 577	5	33	7	3.7	3.6	3.5
28	9.58 223	30	9.61 651	36	0.38 349	9.96 572	5	32	8	4.3	4.1	4.0
29	9.58 253	31	9.61 687	35	0.38 313	9.96 567	5	31	9	4.8	4.6	4.5
30	9.58 284	30	9.61 722	36	0.38 278	9.96 562	6	30	10	5.3	5.2	5.0
31	9.58 314	31	9.61 758	36	0.38 242	9.96 556	5	29	20	10.7	10.3	10.0
32	9.58 345	30	9.61 794	36	0.38 206	9.96 551	5	28	30	16.0	15.5	15.0
33	9.58 375	31	9.61 830	35	0.38 170	9.96 546	5	27	40	21.3	20.7	20.0
34	9.58 406	30	9.61 865	36	0.38 135	9.96 541	6	26	50	26.7	25.8	25.0
35	9.58 436	31	9.61 901	35	0.38 099	9.96 535	5	25			
36	9.58 467	30	9.61 936	36	0.38 064	9.96 530	5	24			
37	9.58 497	30	9.61 972	36	0.38 028	9.96 525	5	23			
38	9.58 527	30	9.62 008	35	0.37 992	9.96 520	6	22			
39	9.58 557	31	9.62 043	36	0.37 957	9.96 514	5	21			
40	9.58 588	30	9.62 079	35	0.37 921	9.96 509	5	20			
41	9.58 618	30	9.62 114	36	0.37 886	9.96 504	6	19			
42	9.58 648	30	9.62 150	35	0.37 850	9.96 498	5	18			
43	9.58 678	31	9.62 185	36	0.37 815	9.96 493	5	17		**29**	**6**	**5**
44	9.58 709	30	9.62 221	35	0.37 779	9.96 488	5	16	6	2.9	0.6	0.5
45	9.58 739	30	9.62 256	36	0.37 744	9.96 483	6	15	7	3.4	0.7	0.6
46	9.58 769	30	9.62 292	35	0.37 708	9.96 477	5	14	8	3.9	0.8	0.7
47	9.58 799	30	9.62 327	35	0.37 673	9.96 472	5	13	9	4.4	0.9	0.8
48	9.58 829	30	9.62 362	36	0.37 638	9.96 467	6	12	10	4.8	1.0	0.8
49	9.58 859	30	9.62 398	35	0.37 602	9.96 461	5	11	20	9.7	2.0	1.7
50	9.58 889	30	9.62 433	35	0.37 567	9.96 456	5	10	30	14.5	3.0	2.5
51	9.58 919	30	9.62 468	36	0.37 532	9.96 451	6	9	40	19.3	4.0	3.3
52	9.58 949	30	9.62 504	35	0.37 496	9.96 445	5	8	50	24.2	5.0	4.2
53	9.58 979	30	9.62 539	35	0.37 461	9.96 440	5	7			
54	9.59 009	30	9.62 574	35	0.37 426	9.96 435	6	6			
55	9.59 039	30	9.62 609	36	0.37 391	9.96 429	5	5			
56	9.59 069	29	9.62 645	35	0.37 355	9.96 424	5	4			
57	9.59 098	30	9.62 680	35	0.37 320	9.96 419	6	3			
58	9.59 128	30	9.62 715	35	0.37 285	9.96 413	5	2			
59	9.59 158	30	9.62 750	35	0.37 250	9.96 408	5	1			
60	9.59 188		9.62 785		0.37 215	9.96 403		0			
	L Cos	d	L Cot	o d	L Tan	L Sin	d	′	Prop. Pts.		

′	L Sin	d	L Tan	o d	L Cot	L Cos	d		Prop. Pts.
0	9.59 188	30	9.62 785	35	0.37 215	9.96 403	6	60	
1	9.59 218	30	9.62 820	35	0.37 180	9.96 397		59	
2	9.59 247	29	9.62 855	35	0.37 145	9.96 392	5	58	
3	9.59 277	30	9.62 890	35	0.37 110	9.96 387	5	57	
4	9.59 307	30	9.62 926	36	0.37 074	9.96 381	6	56	
5	9.59 336	30	9.62 961	35	0.37 039	9.96 376	5	55	
6	9.59 366	30	9.62 996	35	0.37 004	9.96 370	6	54	
7	9.59 396	30	9.63 031	35	0.36 969	9.96 365	5	53	
8	9.59 425	29	9.63 066	35	0.36 934	9.96 360	5	52	
9	9.59 455	30	9.63 101	35	0.36 899	9.96 354	6	51	

	36	**35**	**34**
6	3.6	3.5	3.4
7	4.2	4.1	4.0
8	4.8	4.7	4.5
9	5.4	5.2	5.1
10	6.0	5.8	5.7
20	12.0	11.7	11.3
30	18.0	17.5	17.0
40	24.0	23.3	22.7
50	30.0	29.2	28.3

′	L Sin	d	L Tan	o d	L Cot	L Cos	d		
10	9.59 484	29	9.63 135	34	0.36 865	9.96 349	5	50	
11	9.59 514	30	9.63 170	35	0.36 830	9.96 343	6	49	
12	9.59 543	29	9.63 205	95	0.36 795	9.96 338	5	48	
13	9.59 573	30	9.63 240	35	0.36 760	9.96 333	5	47	
14	9.59 602	29	9.63 275	35	0.36 725	9.96 327	6	46	
15	9.59 632	30	9.63 310	35	0.36 690	9.96 322	5	45	
16	9.59 661	29	9.63 345	35	0.36 655	9.96 316	5	44	
17	9.59 690	30	9.63 379	34	0.36 621	9.96 311	6	43	
18	9.59 720	29	9.63 414	35	0.36 586	9.96 305	5	42	
19	9.59 749	29	9.63 449	35	0.36 551	9.96 300	5	41	
20	9.59 778	30	9.63 484	35	0.36 516	9.96 294	6	40	
21	9.59 808	29	9.63 519	34	0.36 481	9.96 289	5	39	
22	9.59 837	29	9.63 553	35	0.36 447	9.96 284	6	38	
23	9.59 866	29	9.63 588	35	0.36 412	9.96 278	5	37	
24	9.59 895	29	9.63 623	34	0.36 377	9.96 273	6	36	
25	9.59 924	30	9.63 657	35	0.36 343	9.96 267	5	35	
26	9.59 954	29	9.63 692	34	0.36 308	9.96 262	6	34	

	30	**29**	**28**
6	3.0	2.9	2.8
7	3.5	3.4	3.3
8	4.0	3.9	3.7
9	4.5	4.4	4.2
10	5.0	4.8	4.7
20	10.0	9.7	9.3
30	15.0	14.5	14.0
40	20.0	19.3	18.7
50	25.0	24.2	23.3

′	L Sin	d	L Tan	o d	L Cot	L Cos	d		
27	9.59 983	29	9.63 726	34	0.36 274	9.96 256	5	33	
28	9.60 012	29	9.63 761	35	0.36 239	9.96 251	6	32	
29	9.60 041	29	9.63 796	35	0.36 204	9.96 245	5	31	
30	9.60 070	29	9.63 830	34	0.36 170	9.96 240	6	30	
31	9.60 099	29	9.63 865	35	0.36 135	9.96 234	5	29	
32	9.60 128	29	9.63 899	34	0.36 101	9.96 229	6	28	
33	9.60 157	29	9.63 934	35	0.36 066	9.96 223	5	27	
34	9.60 186	29	9.63 968	34	0.36 032	9.96 218	6	26	
35	9.60 215	29	9.64 003	35	0.35 997	9.96 212	5	25	
36	9.60 244	29	9.64 037	34	0.35 963	9.96 207	6	24	
37	9.60 273	29	9.64 072	35	0.35 928	9.96 201	5	23	
38	9.60 302	29	9.64 106	34	0.35 894	9.96 196	6	22	
39	9.60 331	28	9.64 140	34	0.35 860	9.96 190	5	21	
40	9.60 359	29	9.64 175	35	0.35 825	9.96 185	6	20	
41	9.60 388	29	9.64 209	34	0.35 791	9.96 179	5	19	
42	9.60 417	29	9.64 243	34	0.35 757	9.96 174	6	18	
43	9.60 446	28	9.64 278	35	0.35 722	9.96 168	6	17	

	6	**5**
6	0.6	0.5
7	0.7	0.6
8	0.8	0.7
9	0.9	0.8
10	1.0	0.8
20	2.0	1.7
30	3.0	2.5
40	4.0	3.3
50	5.0	4.2

′	L Sin	d	L Tan	o d	L Cot	L Cos	d		
44	9.60 474	29	9.64 312	34	0.35 688	9.96 162	5	16	
45	9.60 503	29	9.64 346	35	0.35 654	9.96 157	6	15	
46	9.60 532	29	9.64 381	34	0.35 619	9.96 151	5	14	
47	9.60 561	28	9.64 415	34	0.35 585	9.96 146	6	13	
48	9.60 589	29	9.64 449	34	0.35 551	9.96 140	5	12	
49	9.60 618	28	9.64 483	34	0.35 517	9.96 135	6	11	
50	9.60 646	29	9.64 517	35	0.35 483	9.96 129	6	10	
51	9.60 675	29	9.64 552	34	0.35 448	9.96 123	5	9	
52	9.60 704	28	9.64 586	34	0.35 414	9.96 118	6	8	
53	9.60 732	29	9.64 620	34	0.35 380	9.96 112	5	7	
54	9.60 761	28	9.64 654	34	0.35 346	9.96 107	6	6	
55	9.60 789	29	9.64 688	34	0.35 312	9.96 101	6	5	
56	9.60 818	28	9.64 722	34	0.35 278	9.96 095	5	4	
57	9.60 846	29	9.64 756	34	0.35 244	9.96 090	6	3	
58	9.60 875	28	9.64 790	34	0.35 210	9.96 084	5	2	
59	9.60 903	28	9.64 824	34	0.35 176	9.96 079	6	1	
60	9.60 931		9.64 858		0.35 142	9.96 073		0	

	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	′
0	9.60 931	29	9.64 858	34	0.35 142	9.96 073	6	60
1	9.60 960	28	9.64 892	34	0.35 108	9.96 067		59
2	9.60 988	28	9.64 926	34	0.35 074	9.96 062	5	58
3	9.61 016	29	9.64 960	34	0.35 040	9.96 056	6	57
4	9.61 045	28	9.64 994	34	0.35 006	9.96 050		56
5	9.61 073	28	9.65 028	34	0.34 972	9.96 045	5	55
6	9.61 101	28	9.65 062	34	0.34 938	9.96 039		54
7	9.61 129	29	9.65 096	34	0.34 904	9.96 034	5	53
8	9.61 158	28	9.65 130	34	0.34 870	9.96 028	6	52
9	9.61 186	28	9.65 164	33	0.34 836	9.96 022	5	51
10	9.61 214	28	9.65 197	34	0.34 803	9.96 017		50
11	9.61 242	28	9.65 231	34	0.34 769	9.96 011	6	49
12	9.61 270	28	9.65 265	34	0.34 735	9.96 005		48
13	9.61 298	28	9.65 299	34	0.34 701	9.96 000	5	47
14	9.61 326	28	9.65 333	33	0.34 667	9.95 994	6	46
15	9.61 354	28	9.65 366	34	0.34 634	9.95 988		45
16	9.61 382	29	9.65 400	34	0.34 600	9.95 982	5	44
17	9.61 411	27	9.65 434	34	0.34 566	9.95 977	6	43
18	9.61 438	28	9.65 467	33	0.34 533	9.95 971	6	42
19	9.61 466	28	9.65 501	34	0.34 499	9.95 965		41
20	9.61 494	28	9.65 535	33	0.34 465	9.95 960	5	40
21	9.61 522	28	9.65 568	34	0.34 432	9.95 954	6	39
22	9.61 550	28	9.65 602	34	0.34 398	9.95 948		38
23	9.61 578	28	9.65 636	34	0.34 364	9.95 942	5	37
24	9.61 606	28	9.65 669	34	0.34 331	9.95 937	6	36
25	9.61 634	28	9.65 703	33	0.34 297	9.95 931		35
26	9.61 662	27	9.65 736	34	0.34 264	9.95 925	6	34
27	9.61 689	28	9.65 770	33	0.34 230	9.95 920	6	33
28	9.61 717	28	9.65 803	34	0.34 197	9.95 914		32
29	9.61 745	28	9.65 837	33	0.34 163	9.95 908	6	31
30	9.61 773	27	9.65 870	34	0.34 130	9.95 902		30
31	9.61 800	28	9.65 904	33	0.34 096	9.95 897	5	29
32	9.61 828	28	9.65 937	34	0.34 063	9.95 891	6	28
33	9.61 856	27	9.65 971	33	0.34 029	9.95 885		27
34	9.61 883	28	9.66 004	34	0.33 996	9.95 879	6	26
35	9.61 911	28	9.66 038	33	0.33 962	9.95 873	5	25
36	9.61 939	27	9.66 071	33	0.33 929	9.95 868	6	24
37	9.61 966	28	9.66 104	34	0.33 896	9.95 862		23
38	9.61 994	27	9.66 138	33	0.33 862	9.95 856	6	22
39	9.62 021	28	9.66 171	33	0.33 829	9.95 850	6	21
40	9.62 049	27	9.66 204	34	0.33 796	9.95 844		20
41	9.62 076	28	9.66 238	33	0.33 762	9.95 839	5	19
42	9.62 104	27	9.66 271	33	0.33 729	9.95 833	6	18
43	9.62 131	28	9.66 304	33	0.33 696	9.95 827		17
44	9.62 159	27	9.66 337	33	0.33 663	9.95 821	6	16
45	9.62 186	28	9.66 371	33	0.33 629	9.95 815		15
46	9.62 214	27	9.66 404	33	0.33 596	9.95 810	5	14
47	9.62 241	27	9.66 437	33	0.33 563	9.95 804	6	13
48	9.62 268	28	9.66 470	33	0.33 530	9.95 798		12
49	9.62 296	27	9.66 503	34	0.33 497	9.95 792	6	11
50	9.62 323	27	9.66 537	33	0.33 463	9.95 786		10
51	9.62 350	27	9.66 570	33	0.33 430	9.95 780	6	9
52	9.62 377	28	9.66 603	33	0.33 397	9.95 775	5	8
53	9.62 405	27	9.66 636	33	0.33 364	9.95 769	6	7
54	9.62 432	27	9.66 669	33	0.33 331	9.95 763	6	6
55	9.62 459	27	9.66 702	33	0.33 298	9.95 757		5
56	9.62 486	27	9.66 735	33	0.33 265	9.95 751	6	4
57	9.62 513	28	9.66 768	33	0.33 232	9.95 745	6	3
58	9.62 541	27	9.66 801	33	0.33 199	9.95 739		2
59	9.62 568	27	9.66 834	33	0.33 166	9.95 733	5	1
60	9.62 595		9.66 867	33	0.33 133	9.95 728		0
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′

Prop. Pts.

	34	33	29
6	3.4	3.3	2.9
7	4.0	3.9	3.4
8	4.5	4.4	3.9
9	5.1	5.0	4.4
10	5.7	5.5	4.8
20	11.3	11.0	9.7
30	17.0	16.5	14.5
40	22.7	22.0	19.3
50	28.3	27.5	24.2

	28	27
6	2.8	2.7
7	3.3	3.2
8	3.7	3.6
9	4.2	4.1
10	4.7	4.5
20	9.3	9.0
30	14.0	13.5
40	18.7	18.0
50	23.3	22.5

	6	5
6	0.6	0.5
7	0.7	0.6
8	0.8	0.7
9	0.9	0.8
10	1.0	0.8
20	2.0	1.7
30	3.0	2.5
40	4.0	3.3
50	5.0	4.2

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	
0	9.62 595	27	9.66 867	33	0.33 133	9.95 728	6	60
1	9.62 622	27	9.66 900	33	0.33 100	9.95 722	6	59
2	9.62 649	27	9.66 933	33	0.33 067	9.95 716	6	58
3	9.62 676	27	9.66 966	33	0.33 034	9.95 710	6	57
4	9.62 703	27	9.66 999	33	0.33 001	9.95 704	6	56
5	9.62 730	27	9.67 032	33	0.32 968	9.95 698	6	55
6	9.62 757	27	9.67 065	33	0.32 935	9.95 692	6	54
7	9.62 784	27	9.67 098	33	0.32 902	9.95 686	6	53
8	9.62 811	27	9.67 131	32	0.32 869	9.95 680	6	52
9	9.62 838	27	9.67 163	33	0.32 837	9.95 674	6	51
10	9.62 865	27	9.67 196	33	0.32 804	9.95 668	5	50
11	9.62 892	26	9.67 229	33	0.32 771	9.95 663	6	49
12	9.62 918	27	9.67 262	33	0.32 738	9.95 657	6	48
13	9.62 945	27	9.67 295	32	0.32 705	9.95 651	6	47
14	9.62 972	27	9.67 327	33	0.32 673	9.95 645	6	46
15	9.62 999	27	9.67 360	33	0.32 640	9.95 639	6	45
16	9.63 026	26	9.67 393	33	0.32 607	9.95 633	6	44
17	9.63 052	27	9.67 426	32	0.32 574	9.95 627	6	43
18	9.63 079	27	9.67 458	33	0.32 542	9.95 621	6	42
19	9.63 106	27	9.67 491	33	0.32 509	9.95 615	6	41
20	9.63 133	26	9.67 524	32	0.32 476	9.95 609	6	40
21	9.63 159	27	9.67 556	33	0.32 444	9.95 603	6	39
22	9.63 186	27	9.67 589	33	0.32 411	9.95 597	6	38
23	9.63 213	26	9.67 622	32	0.32 378	9.95 591	6	37
24	9.63 239	27	9.67 654	33	0.32 346	9.95 585	6	36
25	9.63 266	26	9.67 687	32	0.32 313	9.95 579	6	35
26	9.63 292	27	9.67 719	33	0.32 281	9.95 573	6	34
27	9.63 319	26	9.67 752	33	0.32 248	9.95 567	6	33
28	9.63 345	27	9.67 785	32	0.32 215	9.95 561	6	32
29	9.63 372	26	9.67 817	33	0.32 183	9.95 555	6	31
30	9.63 398	27	9.67 850	32	0.32 150	9.95 549	6	30
31	9.63 425	26	9.67 882	33	0.32 118	9.95 543	6	29
32	9.63 451	27	9.67 915	32	0.32 085	9.95 537	6	28
33	9.63 478	26	9.67 947	33	0.32 053	9.95 531	6	27
34	9.63 504	27	9.67 980	32	0.32 020	9.95 525	6	26
35	9.63 531	26	9.68 012	32	0.31 988	9.95 519	6	25
36	9.63 557	26	9.68 044	33	0.31 956	9.95 513	6	24
37	9.63 583	27	9.68 077	32	0.31 923	9.95 507	7	23
38	9.63 610	26	9.68 109	33	0.31 891	9.95 500	6	22
39	9.63 636	26	9.68 142	32	0.31 858	9.95 494	6	21
40	9.63 662	27	9.68 174	32	0.31 826	9.95 488	6	20
41	9.63 689	26	9.68 206	33	0.31 794	9.95 482	6	19
42	9.63 715	26	9.68 239	32	0.31 761	9.95 476	6	18
43	9.63 741	26	9.68 271	32	0.31 729	9.95 470	6	17
44	9.63 767	27	9.68 303	33	0.31 697	9.95 464	6	16
45	9.63 794	26	9.68 336	32	0.31 664	9.95 458	6	15
46	9.63 820	26	9.68 368	32	0.31 632	9.95 452	6	14
47	9.63 846	26	9.68 400	32	0.31 600	9.95 446	6	13
48	9.63 872	26	9.68 432	33	0.31 568	9.95 440	6	12
49	9.63 898	26	9.68 465	32	0.31 535	9.95 434	7	11
50	9.63 924	26	9.68 497	32	0.31 503	9.95 427	6	10
51	9.63 950	26	9.68 529	32	0.31 471	9.95 421	6	9
52	9.63 976	26	9.68 561	32	0.31 439	9.95 415	6	8
53	9.64 002	26	9.68 593	33	0.31 407	9.95 409	6	7
54	9.64 028	26	9.68 626	32	0.31 374	9.95 403	6	6
55	9.64 054	26	9.68 658	32	0.31 342	9.95 397	6	5
56	9.64 080	26	9.68 690	32	0.31 310	9.95 391	7	4
57	9.64 106	26	9.68 722	32	0.31 278	9.95 384	6	3
58	9.64 132	26	9.68 754	32	0.31 246	9.95 378	6	2
59	9.64 158	26	9.68 786	32	0.31 214	9.95 372	6	1
60	9.64 184		9.68 818		0.31 182	9.95 366		0

| L Cos | d | L Cot | c d | L Tan | L Sin | d | ′ |

Prop. Pts.

	33	32	27
6	3.3	3.2	2.7
7	3.9	3.7	3.2
8	4.4	4.3	3.6
9	5.0	4.8	4.1
10	5.5	5.3	4.5
20	11.0	10.7	9.0
30	16.5	16.0	13.5
40	22.0	21.3	18.0
50	27.5	26.7	22.5

	26	7
6	2.6	0.7
7	3.0	0.8
8	3.5	0.9
9	3.9	1.1
10	4.3	1.2
20	8.7	2.3
30	13.0	3.5
40	17.3	4.7
50	21.7	5.8

	6	5
6	0.6	0.5
7	0.7	0.6
8	0.8	0.7
9	0.9	0.8
10	1.0	0.8
20	2.0	1.7
30	3.0	2.5
40	4.0	3.3
50	5.0	4.2

26°

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.		
0	9.64 184	26	9.68 818	32	0.31 182	9.95 366	6	60			
1	9.64 210	26	9.68 850	32	0.31 150	9.95 360	6	59			
2	9.64 236	26	9.68 882	32	0.31 118	9.95 354	6	58			
3	9.64 262	26	9.68 914	32	0.31 086	9.95 348	7	57			
4	9.64 288	25	9.68 946	32	0.31 054	9.95 341	6	56			
5	9.64 313	26	9.68 978	32	0.31 022	9.95 335	6	55			
6	9.64 339	26	9.69 010	32	0.30 990	9.95 329	6	54			
7	9.64 365	26	9.69 042	32	0.30 958	9.95 323	6	53		**32**	**31**	**26**
8	9.64 391	26	9.69 074	32	0.30 926	9.95 317	7	52				
9	9.64 417	25	9.69 106	32	0.30 894	9.95 310	6	51	6	3.2	3.1	2.6
10	9.64 442	26	9.69 138	32	0.30 862	9.95 304	6	50	7	3.7	3.6	3.0
11	9.64 468	26	9.69 170	32	0.30 830	9.95 298	6	49	8	4.3	4.1	3.5
12	9.64 494	25	9.69 202	32	0.30 798	9.95 292	6	48	9	4.8	4.6	3.9
13	9.64 519	26	9.69 234	32	0.30 766	9.95 286	7	47	10	5.3	5.2	4.3
14	9.64 545	26	9.69 266	32	0.30 734	9.95 279	6	46	20	10.7	10.3	8.7
15	9.64 571	25	9.69 298	32	0.30 702	9.95 273	6	45	30	16.0	15.5	13.0
16	9.64 596	26	9.69 329	31	0.30 671	9.95 267	6	44	40	21.3	20.7	17.3
17	9.64 622	25	9.69 361	32	0.30 639	9.95 261	6	43	50	26.7	25.8	21.7
18	9.64 647	26	9.69 393	32	0.30 607	9.95 254	7	42				
19	9.64 673	25	9.69 425	32	0.30 575	9.95 248	6	41				
20	9.64 698	26	9.69 457	31	0.30 543	9.95 242	6	40				
21	9.64 724	25	9.69 488	32	0.30 512	9.95 236	7	39				
22	9.64 749	26	9.69 520	32	0.30 480	9.95 229	6	38				
23	9.64 775	25	9.69 552	32	0.30 448	9.95 223	6	37				
24	9.64 800	26	9.69 584	31	0.30 416	9.95 217	6	36				
25	9.64 826	25	9.69 615	32	0.30 385	9.95 211	7	35				
26	9.64 851	26	9.69 647	32	0.30 353	9.95 204	6	34		**25**	**24**	
27	9.64 877	25	9.69 679	31	0.30 321	9.95 198	6	33				
28	9.64 902	25	9.69 710	32	0.30 290	9.95 192	7	32	6	2.5	2.4	
29	9.64 927	26	9.69 742	32	0.30 258	9.95 185	6	31	7	2.9	2.8	
30	9.64 953	25	9.69 774	31	0.30 226	9.95 179	6	30	8	3.3	3.2	
31	9.64 978	25	9.69 805	32	0.30 195	9.95 173	6	29	9	3.8	3.6	
32	9.65 003	26	9.69 837	31	0.30 163	9.95 167	7	28	10	4.2	4.0	
33	9.65 029	25	9.69 868	32	0.30 132	9.95 160	6	27	20	8.3	8.0	
34	9.65 054	25	9.69 900	32	0.30 100	9.95 154	6	26	30	12.5	12.0	
35	9.65 079	25	9.69 932	31	0.30 068	9.95 148	7	25	40	16.7	16.0	
36	9.65 104	26	9.69 963	32	0.30 037	9.95 141	6	24	50	20.8	20.0	
37	9.65 130	25	9.69 995	31	0.30 005	9.95 135	6	23				
38	9.65 155	25	9.70 026	32	0.29 974	9.95 129	7	22				
39	9.65 180	25	9.70 058	31	0.29 942	9.95 122	6	21				
40	9.65 205	25	9.70 089	32	0.29 911	9.95 116	6	20				
41	9.65 230	25	9.70 121	31	0.29 879	9.95 110	7	19				
42	9.65 255	26	9.70 152	32	0.29 848	9.95 103	6	18				
43	9.65 281	25	9.70 184	31	0.29 816	9.95 097	7	17				
44	9.65 306	25	9.70 215	32	0.29 785	9.95 090	6	16		**7**	**6**	
45	9.65 331	25	9.70 247	31	0.29 753	9.95 084	6	15				
46	9.65 356	25	9.70 278	31	0.29 722	9.95 078	7	14	6	0.7	0.6	
47	9.65 381	25	9.70 309	32	0.29 691	9.95 071	6	13	7	0.8	0.7	
48	9.65 406	25	9.70 341	31	0.29 659	9.95 065	6	12	8	0.9	0.8	
49	9.65 431	25	9.70 372	32	0.29 628	9.95 059	7	11	9	1.0	0.9	
50	9.65 456	25	9.70 404	31	0.29 596	9.95 052	6	10	10	1.2	1.0	
51	9.65 481	25	9.70 435	31	0.29 565	9.95 046	7	9	20	2.3	2.0	
52	9.65 506	25	9.70 466	31	0.29 534	9.95 039	6	8	30	3.5	3.0	
53	9.65 531	25	9.70 498	32	0.29 502	9.95 033	6	7	40	4.7	4.0	
54	9.65 556	24	9.70 529	31	0.29 471	9.95 027	7	6	50	5.8	5.0	
55	9.65 580	25	9.70 560	32	0.29 440	9.95 020	6	5				
56	9.65 605	25	9.70 592	31	0.29 408	9.95 014	7	4				
57	9.65 630	25	9.70 623	31	0.29 377	9.95 007	6	3				
58	9.65 655	25	9.70 654	31	0.29 346	9.95 001	6	2				
59	9.65 680	25	9.70 685	32	0.29 315	9.94 995	7	1				
60	9.65 705		9.70 717		0.29 283	9.94 988		0				
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.		

63°

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.
0	9.65 705	24	9.70 717	31	0.29 283	9.94 988	6	60	
1	9.65 729	25	9.70 748	31	0.29 252	9.94 982	7	59	
2	9.65 754	25	9.70 779	31	0.29 221	9.94 975	6	58	
3	9.65 779	25	9.70 810	31	0.29 190	9.94 969	7	57	
4	9.65 804	24	9.70 841	32	0.29 159	9.94 962	6	56	
5	9.65 828	25	9.70 873	31	0.29 127	9.94 956	7	55	
6	9.65 853	25	9.70 904	31	0.29 096	9.94 949	6	54	
7	9.65 878	24	9.70 935	31	0.29 065	9.94 943	7	53	
8	9.65 902	25	9.70 966	31	0.29 034	9.94 936	7	52	32 | 31 | 30
9	9.65 927	25	9.70 997	31	0.29 003	9.94 930	6	51	6 3.2 3.1 3.0
10	9.65 952	24	9.71 028	31	0.28 972	9.94 923	7	50	7 3.7 3.6 3.5
11	9.65 976	25	9.71 059	31	0.28 941	9.94 917	6	49	8 4.3 4.1 4.0
12	9.66 001	24	9.71 090	31	0.28 910	9.94 911	7	48	9 4.8 4.6 4.5
13	9.66 025	25	9.71 121	32	0.28 879	9.94 904	6	47	20 10.7 10.3 10.0
14	9.66 050	25	9.71 153	31	0.28 847	9.94 898	7	46	30 16.0 15.5 15.0
15	9.66 075	24	9.71 184	31	0.28 816	9.94 891	7	45	40 21.3 20.7 20.0
16	9.66 099	25	9.71 215	31	0.28 785	9.94 885	6	44	50 26.7 25.8 25.0
17	9.66 124	24	9.71 246	31	0.28 754	9.94 878	7	43	
18	9.66 148	25	9.71 277	31	0.28 723	9.94 871	6	42	
19	9.66 173	24	9.71 308	31	0.28 692	9.94 865	7	41	
20	9.66 197	24	9.71 339	31	0.28 661	9.94 858	6	40	
21	9.66 221	25	9.71 370	31	0.28 630	9.94 852	7	39	
22	9.66 246	24	9.71 401	30	0.28 599	9.94 845	6	38	
23	9.66 270	25	9.71 431	31	0.28 569	9.94 839	7	37	
24	9.66 295	24	9.71 462	31	0.28 538	9.94 832	6	36	
25	9.66 319	24	9.71 493	31	0.28 507	9.94 826	7	35	25 | 24 | 23
26	9.66 343	25	9.71 524	31	0.28 476	9 94 819	6	34	6 2.5 2.4 2.3
27	9.66 368	24	9.71 555	31	0.28 445	9.94 813	7	33	7 2.9 2.8 2.7
28	9.66 392	24	9.71 586	31	0.28 414	9.94 806	7	32	8 3.3 3.2 3.1
29	9.66 416	25	9.71 617	31	0.28 383	9.94 799	6	31	9 3.8 3.6 3.5
30	9.66 441	24	9.71 648	31	0.28 352	9.94 793	7	30	10 4.2 4.0 3.8
31	9.66 465	24	9.71 679	30	0.28 321	9.94 786	6	29	20 8.3 8.0 7.7
32	9.66 489	24	9.71 709	31	0.28 291	9.94 780	7	28	30 12.5 12.0 11.5
33	9.66 513	24	9.71 740	31	0.28 260	9.94 773	6	27	40 16.7 16.0 15.3
34	9.66 537	25	9.71 771	31	0.28 229	9.94 767	7	26	50 20.8 20.0 19.2
35	9.66 562	24	9.71 802	31	0.28 198	9.94 760	7	25	
36	9.66 586	24	9.71 833	30	0.28 167	9.94 753	6	24	
37	9.66 610	24	9.71 863	31	0.28 137	9.94 747	7	23	
38	9.66 634	24	9.71 894	31	0.28 106	9.94 740	6	22	
39	9.66 658	24	9.71 925	30	0.28 075	9.94 734	7	21	
40	9.66 682	24	9.71 955	31	0.28 045	9.94 727	7	20	
41	9.66 706	25	9.71 986	31	0.28 014	9.94 720	6	19	
42	9.66 731	24	9.72 017	31	0.27 983	9.94 714	7	18	
43	9.66 755	24	9.72 048	30	0.27 952	9.94 707	7	17	
44	9.66 779	24	9.72 078	31	0.27 922	9.94 700	6	16	7 | 6
45	9.66 803	24	9.72 109	31	0.27 891	9.94 694	7	15	6 0.7 0.6
46	9.66 827	24	9.72 140	30	0.27 860	9.94 687	7	14	7 0.8 0.7
47	9.66 851	24	9.72 170	31	0.27 830	9.94 680	6	13	8 0.9 0.8
48	9.66 875	24	9.72 201	30	0.27 799	9.94 674	7	12	9 1.1 0.9
49	9.66 899	23	9.72 231	31	0.27 769	9.94 667	7	11	10 1.2 1.0
50	9.66 922	24	9.72 262	31	0.27 738	9.94 660	6	10	20 2.3 2.0
51	9.66 946	24	9.72 293	30	0.27 707	9.94 654	7	9	30 3.5 3.0
52	9.66 970	24	9.72 323	31	0.27 677	9.94 647	7	8	40 4.7 4.0
53	9.66 994	24	9.72 354	30	0.27 646	9.94 640	6	7	50 5.8 5.0
54	9.67 018	24	9.72 384	31	0.27 616	9.94 634	7	6	
55	9.67 042	24	9.72 415	30	0.27 585	9.94 627	7	5	
56	9.67 066	24	9.72 445	31	0.27 555	9.94 620	6	4	
57	9.67 090	23	9.72 476	30	0.27 524	9.94 614	7	3	
58	9.67 113	24	9.72 506	31	0.27 494	9.94 607	7	2	
59	9.67 137	24	9.72 537	30	0.27 463	9.94 600	7	1	
60	9.67 161		9.72 567		0.27 433	9.94 593		0	
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	′
0	9.67 161	24	9.72 567	31	0.27 433	9.94 593	6	60
1	9.67 185	23	9.72 598	30	0.27 402	9.94 587	7	59
2	9.67 208	24	9.72 628	31	0.27 372	9.94 580	7	58
3	9.67 232	24	9.72 659	30	0.27 341	9.94 573	6	57
4	9.67 256	24	9.72 689	31	0.27 311	9.94 567	7	56
5	9.67 280	23	9.72 720	30	0.27 280	9.94 560	7	55
6	9.67 303	24	9.72 750	30	0.27 250	9.94 553	7	54
7	9.67 327	23	9.72 780	31	0.27 220	9.94 546	6	53
8	9.67 350	24	9.72 811	30	0.27 189	9.94 540	7	52
9	9.67 374	24	9.72 841	31	0.27 159	9.94 533	7	51
10	9.67 398	23	9.72 872	30	0.27 128	9.94 526	7	50
11	9.67 421	24	9.72 902	30	0.27 098	9.94 519	6	49
12	9.67 445	23	9.72 932	31	0.27 068	9.94 513	7	48
13	9.67 468	24	9.72 963	30	0.27 037	9.94 506	7	47
14	9.67 492	23	9.72 993	30	0.27 007	9.94 499	7	46
15	9.67 515	24	9.73 023	31	0.26 977	9.94 492	7	45
16	9.67 539	23	9.73 054	30	0.26 946	9.94 485	6	44
17	9.67 562	24	9.73 084	30	0.26 916	9.94 479	7	43
18	9.67 586	23	9.73 114	30	0.26 886	9.94 472	7	42
19	9.67 609	24	9.73 144	31	0.26 856	9.94 465	7	41
20	9.67 633	23	9.73 175	30	0.26 825	9.94 458	7	40
21	9.67 656	24	9.73 205	30	0.26 795	9.94 451	6	39
22	9.67 680	23	9.73 235	30	0.26 765	9.94 445	7	38
23	9.67 703	23	9.73 265	30	0.26 735	9.94 438	7	37
24	9.67 726	24	9.73 295	31	0.26 705	9.94 431	7	36
25	9.67 750	23	9.73 326	30	0.26 674	9.94 424	7	35
26	9.67 773	23	9.73 356	30	0.26 644	9.94 417	7	34
27	9.67 796	24	9.73 386	30	0.26 614	9.94 410	6	33
28	9.67 820	23	9.73 416	30	0.26 584	9.94 404	7	32
29	9.67 843	23	9.73 446	30	0.26 554	9.94 397	7	31
30	9.67 860	24	9.73 476	31	0.26 524	9.94 390	7	30
31	9.67 890	23	9.73 507	30	0.26 493	9.94 383	7	29
32	9.67 913	23	9.73 537	30	0.26 463	9.94 376	7	28
33	9.67 936	23	9.73 567	30	0.26 433	9.94 369	7	27
34	9.67 959	23	9.73 597	30	0.26 403	9.94 362	7	26
35	9.67 982	24	9.73 627	30	0.26 373	9.94 355	6	25
36	9.68 006	23	9.73 657	30	0.26 343	9.94 349	7	24
37	9.68 029	23	9.73 687	30	0.26 313	9.94 342	7	23
38	9.68 052	23	9.73 717	30	0.26 283	9.94 335	7	22
39	9.68 075	23	9.73 747	30	0.26 253	9.94 328	7	21
40	9.68 098	23	9.73 777	30	0.26 223	9.94 321	7	20
41	9.68 121	23	9.73 807	30	0.26 193	9.94 314	7	19
42	9.68 144	23	9.73 837	30	0.26 163	9.94 307	7	18
43	9.68 167	23	9.73 867	30	0.26 133	9.94 300	7	17
44	9.68 190	23	9.73 897	30	0.26 103	9.94 293	7	16
45	9.68 213	24	9.73 927	30	0.26 073	9.94 286	7	15
46	9.68 237	23	9.73 957	30	0.26 043	9.94 279	6	14
47	9.68 260	23	9.73 987	30	0.26 013	9.94 273	7	13
48	9.68 283	22	9.74 017	30	0.25 983	9.94 266	7	12
49	9.68 305	23	9.74 047	30	0.25 953	9.94 259	7	11
50	9.68 328	23	9.74 077	30	0.25 923	9.94 252	7	10
51	9.68 351	23	9.74 107	30	0.25 893	9.94 245	7	9
52	9.68 374	23	9.74 137	29	0.25 863	9.94 238	7	8
53	9.68 397	23	9.74 166	30	0.25 834	9.94 231	7	7
54	9.68 420	23	9.74 196	30	0.25 804	9.94 224	7	6
55	9.68 443	23	9.74 226	30	0.25 774	9.94 217	7	5
56	9.68 466	23	9.74 256	30	0.25 744	9.94 210	7	4
57	9.68 489	23	9.74 286	30	0.25 714	9.94 203	7	3
58	9.68 512	22	9.74 316	29	0.25 684	9.94 196	7	2
59	9.68 534	23	9.74 345	30	0.25 655	9.94 189	7	1
60	9.68 557		9.74 375		0.25 625	9.94 182		0
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′

Prop. Pts.

	31	30	29
6	3.1	3.0	2.9
7	3.6	3.5	3.4
8	4.1	4.0	3.9
9	4.6	4.5	4.4
10	5.2	5.0	4.8
20	10.3	10.0	9.7
30	15.5	15.0	14.5
40	20.7	20.0	19.3
50	25.8	25.0	24.2

	24	23	22
6	2.4	2.3	2.2
7	2.8	2.7	2.6
8	3.2	3.1	2.9
9	3.6	3.5	3.3
10	4.0	3.8	3.7
20	8.0	7.7	7.3
30	12.0	11.5	11.0
40	16.0	15.3	14.7
50	20.0	19.2	18.3

	7	6
6	0.7	0.6
7	0.8	0.7
8	0.9	0.8
9	1.0	0.9
10	1.2	1.0
20	2.3	2.0
30	3.5	3.0
40	4.7	4.0
50	5.8	5.0

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	″	Prop. Pts.
0	9.68 557	23	9.74 375	30	0.25 625	9.94 182	7	60	
1	9.68 580	23	9.74 405	30	0.25 595	9.94 175	7	59	
2	9.68 603	22	9.74 435	30	0.25 565	9.94 168	7	58	
3	9.68 625	23	9.74 465	29	0.25 535	9.94 161	7	57	
4	9.68 648	23	9.74 494	30	0.25 506	9.94 154	7	56	
5	9.68 671	23	9.74 524	30	0.25 476	9.94 147	7	55	
6	9.68 694	22	9.74 554	29	0.25 446	9.94 140	7	54	
7	9.68 716	23	9.74 583	30	0.25 417	9.94 133	7	53	
8	9.68 739	23	9.74 613	30	0.25 387	9.94 126	7	52	
9	9.68 762	22	9.74 643	30	0.25 357	9.94 119	7	51	
10	9.68 784	23	9.74 673	29	0.25 327	9.94 112	7	50	
11	9.68 807	22	9.74 702	30	0.25 298	9.94 105	7	49	
12	9.68 829	23	9.74 732	30	0.25 268	9.94 098	8	48	
13	9.68 852	23	9.74 762	29	0.25 238	9.94 090	7	47	
14	9.68 875	22	9.74 791	30	0.25 209	9.94 083	7	46	
15	9.68 897	23	9.74 821	30	0.25 179	9.94 076	7	45	
16	9.68 920	22	9.74 851	29	0.25 149	9.94 069	7	44	
17	9.68 942	23	9.74 880	30	0.25 120	9.94 062	7	43	
18	9.68 965	22	9.74 910	29	0.25 090	9.94 055	7	42	
19	9.68 987	23	9.74 939	30	0.25 061	9.94 048	7	41	
20	9.69 010	22	9.74 969	29	0.25 031	9.94 041	7	40	
21	9.69 032	23	9.74 998	30	0.25 002	9.94 034	7	39	
22	9.69 055	22	9.75 028	30	0.24 972	9.94 027	7	38	
23	9.69 077	23	9.75 058	29	0.24 942	9.94 020	8	37	
24	9.69 100	22	9.75 087	30	0.24 913	9.94 012	7	36	
25	9.69 122	22	9.75 117	29	0.24 883	9.94 005	7	35	
26	9.69 144	23	9.75 146	30	0.24 854	9.93 998	7	34	
27	9.69 167	22	9.75 176	29	0.24 824	9.93 991	7	33	
28	9.69 189	23	9.75 205	30	0.24 795	9.93 984	7	32	
29	9.69 212	22	9.75 235	29	0.24 765	9.93 977	7	31	
30	9.66 234	22	9.75 264	30	0.24 736	9.93 970	7	30	
31	9.69 256	23	9.75 294	29	0.24 706	9.93 963	8	29	
32	9.69 279	22	9.75 323	30	0.24 677	9.93 955	7	28	
33	9.69 301	22	9.75 353	29	0.24 647	9.93 948	7	27	
34	9.69 323	22	9.75 382	29	0.24 618	9.93 941	7	26	
35	9.69 345	23	9.75 411	30	0.24 589	9.93 934	7	25	
36	9.69 368	22	9.75 441	29	0.24 559	9.93 927	7	24	
37	9.69 390	22	9.75 470	30	0.24 530	9.93 920	8	23	
38	9.69 412	22	9.75 500	29	0.24 500	9.93 912	7	22	
39	9.69 434	22	9.75 529	29	0.24 471	9.93 905	7	21	
40	9.69 456	23	9.75 558	30	0.24 442	9.93 898	7	20	
41	9.69 479	22	9.75 588	29	0.24 412	9.93 891	7	19	
42	9.69 501	22	9.75 617	30	0.24 383	9.93 884	8	18	
43	9.69 523	22	9.75 647	29	0.24 353	9.93 876	7	17	
44	9.69 545	22	9.75 676	29	0.24 324	9.93 869	7	16	
45	9.69 567	22	9.75 705	30	0.24 295	9.93 862	7	15	
46	9.69 589	22	9.75 735	29	0.24 265	9.93 855	8	14	
47	9.69 611	22	9.75 764	29	0.24 236	9.93 847	7	13	
48	9.69 633	22	9.75 793	30	0.24 207	9.93 840	7	12	
49	9.69 655	22	9.75 822	30	0.24 178	9.93 833	7	11	
50	9.69 677	22	9.75 852	29	0.24 148	9.93 826	7	10	
51	9.69 699	22	9.75 881	29	0.24 119	9.93 819	8	9	
52	9.69 721	22	9.75 910	29	0.24 090	9.93 811	7	8	
53	9.69 743	22	9.75 939	30	0.24 061	9.93 804	7	7	
54	9.69 765	22	9.75 969	29	0.24 031	9.93 797	8	6	
55	9.69 787	22	9.75 998	29	0.24 002	9.93 789	7	5	
56	9.69 809	22	9.76 027	29	0.23 973	9.93 782	7	4	
57	9.69 831	22	9.76 056	30	0.23 944	9.93 775	7	3	
58	9.69 853	22	9.76 086	29	0.23 914	9.93 768	8	2	
59	9.69 875	22	9.76 115	29	0.23 885	9.93 760	7	1	
60	9.69 897		9.76 144		0.23 856	9.93 753		0	
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

Prop. Pts.

	30	29	23
6	3.0	2.9	2.3
7	3.5	3.5	2.7
8	4.0	3.9	3.1
9	4.5	4.4	3.4
10	5.0	4.8	3.8
20	10.0	9.7	7.7
30	15.0	14.5	11.5
40	20.0	19.3	15.3
50	25.0	24.2	19.2

	22	8	7
6	2.2	0.8	0.7
7	2.6	0.9	0.8
8	2.9	1.1	0.9
9	3.3	1.2	1.0
10	3.7	1.3	1.2
20	7.3	2.7	2.3
30	11.0	4.0	3.5
40	14.7	5.3	4.7
50	18.3	6.7	5.8

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.		
0	9.69 897	22	9.76 144	29	0.23 856	9.93 753	7	**60**			
1	9.69 919	22	9.76 173	29	0.23 827	9.93 746	8	59			
2	9.69 941	22	9.76 202	29	0.23 798	9.93 738	7	58			
3	9.69 963	21	9.76 231	30	0.23 769	9.93 731	7	57			
4	9.69 984	22	9.76 261	29	0.23 739	9.93 724	7	56			
5	9.70 006	22	9.76 290	29	0.23 710	9.93 717	8	55			
6	9.70 028	22	9.76 319	29	0.23 681	9.93 709	7	54			
7	9.70 050	22	9.76 348	29	0.23 652	9.93 702	7	53			
8	9.70 072	21	9.76 377	29	0.23 623	9.93 695	8	52		**30**	**29**	**28**
9	9.70 093	22	9.76 406	29	0.23 594	9.93 687	7	51	6	3.0	2.9	2.8
10	9.70 115	22	9.76 435	29	0.23 565	9.93 680	7	**50**	7	3.5	3.4	3.3
11	9.70 137	22	9.76 464	29	0.23 536	9.93 673	8	49	8	4.0	3.9	3.7
12	9.70 159	21	9.76 493	29	0.23 507	9.93 665	7	48	9	4.5	4.4	4.2
13	9.70 180	22	9.76 522	29	0.23 478	9.93 658	8	47	10	5.0	4.8	4.7
14	9.70 202	22	9.76 551	29	0.23 449	9.93 650	7	46	20	10.0	9.7	9.3
15	9.70 224	21	9.76 580	29	0.23 420	9.93 643	7	45	30	15.0	14.5	14.0
16	9.70 245	22	9.76 609	30	0.23 391	9.93 636	8	44	40	20.0	19.3	18.7
17	9.70 267	21	9.76 639	29	0.23 361	9.93 628	7	43	50	25.0	24.2	23.3
18	9.70 288	22	9.76 668	29	0.23 332	9.93 621	7	42				
19	9.70 310	22	9.76 697	28	0.23 303	9.93 614	8	41				
20	9.70 332	21	9.76 725	29	0.23 275	9.93 606	7	**40**				
21	9.70 353	22	9.76 754	29	0.23 246	9.93 599	8	39				
22	9.70 375	21	9.76 783	29	0.23 217	9.93 591	7	38				
23	9.70 396	22	9.76 812	29	0.23 188	9.93 584	7	37				
24	9.70 418	21	9.76 841	29	0.23 159	9.93 577	8	36				
25	9.70 439	22	9.76 870	29	0.23 130	9.93 569	7	35				
26	9.70 461	21	9.76 899	29	0.23 101	9.93 562	8	34		**22**	**21**	
27	9.70 482	22	9.76 928	29	0.23 072	9.93 554	7	33	6	2.2	2.1	
28	9.70 504	21	9.76 957	29	0.23 043	9.93 547	8	32	7	2.6	2.4	
29	9.70 525	22	9.76 986	29	0.23 014	9.93 539	7	31	8	2.9	2.8	
30	9.70 547	21	9.77 015	29	0.22 985	9.93 532	7	**30**	9	3.3	3.2	
31	9.70 568	22	9.77 044	29	0.22 956	9.93 525	8	29	10	3.7	3.5	
32	9.70 590	21	9.77 073	28	0.22 927	9.93 517	7	28	20	7.3	7.0	
33	9.70 611	22	9.77 101	29	0.22 899	9.93 510	8	27	30	11.0	10.5	
34	9.70 633	21	9.77 130	29	0.22 870	9.93 502	7	26	40	14.7	14.0	
35	9.70 654	21	9.77 159	29	0.22 841	9.93 495	8	25	50	18.3	17.5	
36	9.70 675	22	9.77 188	29	0.22 812	9.93 487	7	24				
37	9.70 697	21	9.77 217	29	0.22 783	9.93 480	8	23				
38	9.70 718	21	9.77 246	28	0.22 754	9.93 472	7	22				
39	9.70 739	22	9.77 274	29	0.22 726	9.93 465	8	21				
40	9.70 761	21	9.77 303	29	0.22 697	9.93 457	7	**20**				
41	9.70 782	21	9.77 332	29	0.22 668	9.93 450	8	19				
42	9.70 803	21	9.77 361	29	0.22 639	9.93 442	7	18				
43	9.70 824	22	9.77 390	28	0.22 610	9.93 435	8	17				
44	9.70 846	21	9.77 418	29	0.22 582	9.93 427	7	16		**8**	**7**	
45	9.70 867	21	9.77 447	29	0.22 553	9.93 420	8	15	6	0.8	0.7	
46	9.70 888	21	9.77 476	29	0.22 524	9.93 412	7	14	7	0.9	0.8	
47	9.70 909	22	9.77 505	28	0.22 495	9.93 405	8	13	8	1.1	0.9	
48	9.70 931	21	9.77 533	29	0.22 467	9.93 397	7	12	9	1.2	1.0	
49	9.70 952	21	9.77 562	29	0.22 438	9.93 390	8	11	10	1.3	1.2	
50	9.70 973	21	9.77 591	28	0.22 409	9.93 382	7	**10**	20	2.7	2.3	
51	9.70 994	21	9.77 619	29	0.22 381	9.93 375	8	9	30	4.0	3.5	
52	9.71 015	21	9.77 648	29	0.22 352	9.93 367	7	8	40	5.3	4.7	
53	9.71 036	22	9.77 677	29	0.22 323	9.93 360	8	7	50	6.7	5.8	
54	9.71 058	21	9.77 706	28	0.22 294	9.93 352	8	6				
55	9.71 079	21	9.77 734	29	0.22 266	9.93 344	7	5				
56	9.71 100	21	9.77 763	28	0.22 237	9.93 337	8	4				
57	9.71 121	21	9.77 791	29	0.22 209	9.93 329	7	3				
58	9.71 142	21	9.77 820	29	0.22 180	9.93 322	8	2				
59	9.71 163	21	9.77 849	28	0.22 151	9.93 314	7	1				
60	9.71 184		9.77 877		0.22 123	9.93 307		**0**				

	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.			
0	9.71 184	21	9.77 877	29	0.22 123	9.93 307	8	**60**				
1	9.71 205	21	9.77 906	29	0.22 094	9.93 299	8	59				
2	9.71 226	21	9.77 935	28	0.22 065	9.93 291	7	58				
3	9.71 247	21	9.77 963	29	0.22 037	9.93 284	8	57				
4	9.71 268	21	9.77 992	28	0.22 008	9.93 276	7	56				
5	9.71 289	21	9.78 020	29	0.21 980	9.93 269	8	55				
6	9.71 310	21	9.78 049	28	0.21 951	9.93 261	8	54				
7	9.71 331	21	9.78 077	29	0.21 923	9.93 253	7	53				
8	9.71 352	21	9.78 106	29	0.21 894	9.93 246	8	52				
9	9.71 373	20	9.78 135	28	0.21 865	9.93 238	8	51				
10	9.71 393	21	9.78 163	29	0.21 837	9.93 230	7	**50**				
11	9.71 414	21	9.78 192	28	0.21 808	9.93 223	8	49				
12	9.71 435	21	9.78 220	29	0.21 780	9.93 215	8	48				
13	9.71 456	21	9.78 249	28	0.21 751	9.93 207	7	47				
14	9.71 477	21	9.78 277	29	0.21 723	9.93 200	8	46		**29**	**28**	**21**
15	9.71 498	21	9.78 306	28	0.21 694	9.93 192	8	45	6	2.9	2.8	2.1
16	9.71 519	20	9.78 334	29	0.21 666	9.93 184	7	44	7	3.5	3.3	2.4
17	9.71 539	21	9.78 363	28	0.21 637	9.93 177	8	43	8	3.9	3.7	2.8
18	9.71 560	21	9.78 391	28	0.21 609	9.93 169	8	42	9	4.4	4.2	3.2
19	9.71 581	21	9.78 419	29	0.21 581	9.93 161	7	41	10	4.8	4.7	3.5
20	9.71 602	20	9.78 448	28	0.21 552	9.93 154	8	**40**	20	9.7	9.3	7.0
21	9.71 622	21	9.78 476	29	0.21 524	9.93 146	8	39	30	14.5	14.0	10.5
22	9.71 643	21	9.78 505	28	0.21 495	9.93 138	7	38	40	19.3	18.7	14.0
23	9.71 664	21	9.78 533	29	0.21 467	9.93 131	8	37	50	24.2	23.3	17.5
24	9.71 685	20	9.78 562	28	0.21 438	9.93 123	8	36				
25	9.71 705	21	9.78 590	28	0.21 410	9.93 115	7	35				
26	9.71 726	21	9.78 618	29	0.21 382	9.93 108	8	34				
27	9.71 747	20	9.78 647	28	0.21 353	9.93 100	8	33				
28	9.71 767	21	9.78 675	29	0.21 325	9.93 092	8	32				
29	9.71 788	21	9.78 704	28	0.21 296	9.93 084	7	31				
30	9.71 809	20	9.78 732	28	0.21 268	9.93 077	8	**30**				
31	9.71 829	21	9.78 760	29	0.21 240	9.93 069	8	29				
32	9.71 850	20	9.78 789	28	0.21 211	9.93 061	8	28				
33	9.71 870	21	9.78 817	28	0.21 183	9.93 053	7	27				
34	9.71 891	20	9.78 845	29	0.21 155	9.93 046	8	26				
35	9.71 911	21	9.78 874	28	0.21 126	9.93 038	8	25				
36	9.71 932	20	9.78 902	28	0.21 098	9.93 030	8	24				
37	9.71 952	21	9.78 930	29	0.21 070	9.93 022	8	23		**20**	**8**	**7**
38	9.71 973	21	9.78 959	28	0.21 041	9.93 014	7	22	6	2.0	0.8	0.7
39	9.71 994	20	9.78 987	28	0.21 013	9.93 007	8	21	7	2.3	0.9	0.8
40	9.72 014	20	9.79 015	28	0.20 985	9.92 999	8	**20**	8	2.7	1.1	0.9
41	9.72 034	21	9.79 043	29	0.20 957	9.92 991	8	19	9	3.0	1.2	1.0
42	9.72 055	20	9.79 072	28	0.20 928	9.92 983	7	18	10	3.3	1.3	1.2
43	9.72 075	21	9.79 100	28	0.20 900	9.92 976	8	17	20	6.7	2.7	2.3
44	9.72 096	20	9.79 128	28	0.20 872	9.92 968	8	16	30	10.0	4.0	3.5
45	9.72 116	21	9.79 156	29	0.20 844	9.92 960	8	15	40	13.3	5.3	4.7
46	9.72 137	20	9.79 185	28	0.20 815	9.92 952	8	14	50	16.7	6.7	5.8
47	9.72 157	20	9.79 213	28	0.20 787	9.92 944	8	13				
48	9.72 177	21	9.79 241	28	0.20 759	9.92 936	7	12				
49	9.72 198	20	9.79 269	28	0.20 731	9.92 929	8	11				
50	9.72 218	20	9.79 297	29	0.20 703	9.92 921	8	**10**				
51	9.72 238	21	9.79 326	28	0.20 674	9.92 913	8	9				
52	9.72 259	20	9.79 354	28	0.20 646	9.92 905	8	8				
53	9.72 279	20	9.79 382	28	0.20 618	9.92 897	8	7				
54	9.72 299	21	9.79 410	28	0.20 590	9.92 889	8	6				
55	9.72 320	20	9.79 438	28	0.20 562	9.92 881	7	5				
56	9.72 340	20	9.79 466	29	0.20 534	9.92 874	8	4				
57	9.72 360	21	9.79 495	28	0.20 505	9.92 866	8	3				
58	9.72 381	20	9.79 523	28	0.20 477	9.92 858	8	2				
59	9.72 401	20	9.79 551	28	0.20 449	9.92 850	8	1				
60	9.72 421		9.79 579		0.20 421	9.92 842		**0**				
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′		Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	′	Prop. Pts.		
0	9.72 421	20	9.79 579	28	0.20 421	9.92 842	8	60			
1	9.72 441	20	9.79 607	28	0.20 393	9.92 834	8	59			
2	9.72 461	21	9.79 635	28	0.20 365	9.92 826	8	58			
3	9.72 482	20	9.79 663	28	0.20 337	9.92 818	8	57			
4	9.72 502	20	9.79 691	28	0.20 309	9.92 810	7	56			
5	9.72 522	20	9.79 719	28	0.20 281	9.92 803	8	55			
6	9.72 542	20	9.79 747	29	0.20 253	9.92 795	8	54			
7	9.72 562	20	9.79 776	28	0.20 224	9.92 787	8	53			
8	9.72 582	20	9.79 804	28	0.20 196	9.92 779	8	52	29	28	27
9	9.72 602	20	9.79 832	28	0.20 168	9.92 771	8	51	6 2.9	2.8	2.7
10	9.72 622	21	9.79 860	28	0.20 140	9.92 763	8	50	7 3.5	3.3	3.2
11	9.72 643	20	9.79 888	28	0.20 112	9.92 755	8	49	8 3.9	3.7	3.6
12	9.72 663	20	9.79 916	28	0.20 084	9.92 747	8	48	9 4.4	4.2	4.1
13	9.72 683	20	9.79 944	28	0.20 056	9.92 739	8	47	10 4.8	4.7	4.5
14	9.72 703	20	9.79 972	28	0.20 028	9.92 731	8	46	20 9.7	9.3	9.0
15	9.72 723	20	9.80 000	28	0.20 000	9.92 723	8	45	30 14.5	14.0	13.5
16	9.72 743	20	9.80 028	28	0.19 972	9.92 715	8	44	40 19.3	18.7	18.0
17	9.72 763	20	9.80 056	28	0.19 944	9.92 707	8	43	50 24.2	23.3	22.5
18	9.72 783	20	9.80 084	28	0.19 916	9.92 699	8	42			
19	9.72 803	20	9.80 112	28	0.19 888	9.92 691	8	41			
20	9.72 823	20	9.80 140	28	0.19 860	9.92 683	8	40			
21	9.72 843	20	9.80 168	27	0.19 832	9.92 675	8	39			
22	9.72 863	20	9.80 195	28	0.19 805	9.92 667	8	38			
23	9.72 883	19	9.80 223	28	0.19 777	9.92 659	8	37			
24	9.72 902	20	9.80 251	28	0.19 749	9.92 651	8	36			
25	9.72 922	20	9.80 279	28	0.19 721	9.92 643	8	35	21	20	19
26	9.72 942	20	9.80 307	28	0.19 693	9.92 635	8	34	6 2.1	2.0	1.9
27	9.72 962	20	9.80 335	28	0.19 665	9.92 627	8	33	7 2.4	2.3	2.2
28	9.72 982	20	9.80 363	28	0.19 637	9.92 619	8	32	8 2.8	2.7	2.5
29	9.73 002	20	9.80 391	28	0.19 609	9.92 611	8	31	9 3.2	3.0	2.9
30	9.73 022	19	9.80 419	28	0.19 581	9.92 603	8	30	10 3.5	3.3	3.2
31	9.73 041	20	9.80 447	27	0.19 553	9.92 595	8	29	20 7.0	6.7	6.3
32	9.73 061	20	9.80 474	28	0.19 526	9.92 587	8	28	30 10.5	10.0	9.5
33	9.73 081	20	9.80 502	28	0.19 498	9.92 579	8	27	40 14.0	13.3	12.7
34	9.73 101	20	9.80 530	28	0.19 470	9.92 571	8	26	50 17.5	16.7	15.8
35	9.73 121	19	9.80 558	28	0.19 442	9.92 563	8	25			
36	9.73 140	20	9.80 586	28	0.19 414	9.92 555	9	24			
37	9.73 160	20	9.80 614	28	0.19 386	9.92 546	8	23			
38	9.73 180	20	9.80 642	27	0.19 358	9.92 538	8	22			
39	9.73 200	19	9.80 669	28	0.19 331	9.92 530	8	21			
40	9.73 219	20	9.80 697	28	0.19 303	9.92 522	8	20			
41	9.73 239	20	9.80 725	28	0.19 275	9.92 514	8	19			
42	9.73 259	19	9.80 753	28	0.19 247	9.92 506	8	18			
43	9.73 278	20	9.80 781	27	0.19 219	9.92 498	8	17	9	8	7
44	9.73 298	20	9.80 808	28	0.19 192	9.92 490	8	16	6 0.9	0.8	0.7
45	9.73 318	19	9.80 836	28	0.19 164	9.92 482	9	15	7 1.1	0.9	0.8
46	9.73 337	20	9.80 864	28	0.19 136	9.92 473	8	14	8 1.2	1.1	0.9
47	9.73 357	20	9.80 892	27	0.19 108	9.92 465	8	13	9 1.4	1.2	1.1
48	9.73 377	19	9.80 919	28	0.19 081	9.92 457	8	12	10 1.5	1.3	1.2
49	9.73 396	20	9.80 947	28	0.19 053	9.92 449	8	11	20 3.0	2.7	2.3
50	9.73 416	19	9.80 975	28	0.19 025	9.92 441	8	10	30 4.5	4.0	3.5
51	9.73 435	20	9.81 003	27	0.18 997	9.92 433	8	9	40 6.0	5.3	4.7
52	9.73 455	19	9.81 030	28	0.18 970	9.92 425	9	8	50 7.5	6.7	5.8
53	9.73 474	20	9.81 058	28	0.18 942	9.92 416	8	7			
54	9.73 494	19	9.81 086	27	0.18 914	9.92 408	8	6			
55	9.73 513	20	9.81 113	28	0.18 887	9.92 400	8	5			
56	9.73 533	19	9.81 141	28	0.18 859	9.92 392	8	4			
57	9.73 552	20	9.81 169	27	0.18 831	9.92 384	8	3			
58	9.73 572	19	9.81 196	28	0.18 804	9.92 376	9	2			
59	9.73 591	20	9.81 224	28	0.18 776	9.92 367	8	1			
60	9.73 611		9.81 252		0.18 748	9.92 359		0			
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	′	Prop. Pts.
0	9.73 611	19	9.81 252	27	0.18 748	9.92 359	8	60	
1	9.73 630	20	9.81 279	28	0.18 721	9.92 351	8	59	
2	9.73 650	19	9.81 307	28	0.18 693	9.92 343	8	58	
3	9.73 669	20	9.81 335	27	0.18 665	9.92 335	9	57	
4	9.73 689	19	9.81 362	28	0.18 638	9.92 326	8	56	
5	9.73 708	19	9.81 390	28	0.18 610	9.92 318	8	55	
6	9.73 727	20	9.81 418	27	0.18 582	9.92 310	8	54	
7	9.73 747	19	9.81 445	28	0.18 555	9.92 302	9	53	
8	9.73 766	19	9.81 473	27	0.18 527	9.92 293	8	52	28 · 27 · 20
9	9.73 785	20	9.81 500	28	0.18 500	9.92 285	8	51	6 · 2.8 · 2.7 · 2.0
10	9.73 805	19	9.81 528	28	0.18 472	9.92 277	8	50	7 · 3.3 · 3.2 · 2.3
11	9.73 824	19	9.81 556	27	0.18 444	9.92 269	9	49	8 · 3.7 · 3.6 · 2.7
12	9.73 843	20	9.81 583	28	0.18 417	9.92 260	8	48	9 · 4.2 · 4.1 · 3.0
13	9.73 863	19	9.81 611	27	0.18 389	9.92 252	8	47	10 · 4.7 · 4.5 · 3.3
14	9.73 882	19	9.81 638	28	0.18 362	9.92 244	9	46	20 · 9.3 · 9.0 · 6.7
15	9.73 901	20	9.81 666	27	0.18 334	9.92 235	8	45	30 · 14.0 · 13.5 · 10.0
16	9.73 921	19	9.81 693	28	0.18 307	9.92 227	8	44	40 · 18.7 · 18.0 · 13.3
17	9.73 940	19	9.81 721	27	0.18 279	9.92 219	8	43	50 · 23.3 · 22.5 · 16.7
18	9.73 959	19	9.81 748	28	0.18 252	9.92 211	9	42	
19	9.73 978	19	9.81 776	27	0.18 224	9.92 202	8	41	
20	9.73 997	20	9.81 803	28	0.18 197	9.92 194	8	40	
21	9.74 017	19	9.81 831	27	0.18 169	9.92 186	9	39	
22	9.74 036	19	9.81 858	28	0.18 142	9.92 177	8	38	
23	9.74 055	19	9.81 886	27	0.18 114	9.92 169	8	37	
24	9.74 074	19	9.81 913	28	0.18 087	9.92 161	9	36	
25	9.74 093	20	9.81 941	27	0.18 059	9.92 152	8	35	19 · 18
26	9.74 113	19	9.81 968	28	0.18 032	9.92 144	8	34	6 · 1.9 · 1.8
27	9.74 132	19	9.81 996	27	0.18 004	9.92 136	9	33	7 · 2.2 · 2.1
28	9.74 151	19	9.82 023	28	0.17 977	9.92 127	8	32	8 · 2.5 · 2.4
29	9.74 170	19	9.82 051	27	0.17 949	9.92 119	8	31	9 · 2.9 · 2.7
30	9.74 189	19	9.82 078	28	0.17 922	9.92 111	9	30	10 · 3.2 · 3.0
31	9.74 208	19	9.82 106	27	0.17 894	9.92 102	8	29	20 · 6.3 · 6.0
32	9.74 227	19	9.82 133	28	0.17 867	9.92 094	8	28	30 · 9.5 · 9.0
33	9.74 246	19	9.82 161	27	0.17 839	9.92 086	9	27	40 · 12.7 · 12.0
34	9.74 265	19	9.82 188	27	0.17 812	9.92 077	8	26	50 · 15.8 · 15.0
35	9.74 284	19	9.82 215	28	0.17 785	9.92 069	9	25	
36	9.74 303	19	9.82 243	27	0.17 757	9.92 060	8	24	
37	9.74 322	19	9.82 270	28	0.17 730	9.92 052	8	23	
38	9.74 341	19	9.82 298	27	0.17 702	9.92 044	9	22	
39	9.74 360	19	9.82 325	27	0.17 675	9.92 035	8	21	
40	9.74 379	19	9.82 352	28	0.17 648	9.92 027	9	20	
41	9.74 398	19	9.82 380	27	0.17 620	9.92 018	8	19	
42	9.74 417	19	9.82 407	28	0.17 593	9.92 010	8	18	
43	9.74 436	19	9.82 435	27	0.17 565	9.92 002	9	17	9 · 8
44	9.74 455	19	9.82 462	27	0.17 538	9.91 993	8	16	6 · 0.9 · 0.8
45	9.74 474	19	9.82 489	28	0.17 511	9.91 985	9	15	7 · 1.1 · 0.9
46	9.74 493	19	9.82 517	27	0.17 483	9.91 976	8	14	8 · 1.2 · 1.1
47	9.74 512	19	9.82 544	27	0.17 456	9.91 968	9	13	9 · 1.4 · 1.2
48	9.74 531	18	9.82 571	28	0.17 429	9.91 959	8	12	10 · 1.5 · 1.3
49	9.74 549	19	9.82 599	27	0.17 401	9.91 951	9	11	20 · 3.0 · 2.7
50	9.74 568	19	9.82 626	27	0.17 374	9.91 942	8	10	30 · 4.5 · 4.0
51	9.74 587	19	9.82 653	28	0.17 347	9.91 934	9	9	40 · 6.0 · 5.3
52	9.74 606	19	9.82 681	27	0.17 319	9.91 925	8	8	50 · 7.5 · 6.7
53	9.74 625	19	9.82 708	27	0.17 292	9.91 917	9	7	
54	9.74 644	18	9.82 735	27	0.17 265	9.91 908	8	6	
55	9.74 662	19	9.82 762	28	0.17 238	9.91 900	9	5	
56	9.74 681	19	9.82 790	27	0.17 210	9.91 891	8	4	
57	9.74 700	19	9.82 817	27	0.17 183	9.91 883	9	3	
58	9.74 719	18	9.82 844	27	0.17 156	9.91 874	8	2	
59	9.74 737	19	9.82 871	28	0.17 129	9.91 866	9	1	
60	9.74 756		9.82 899		0.17 101	9.91 857		0	
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	′	Prop. Pts.		
0	9.74 756	19	9.82 899	27	0.17 101	9.91 857	8	60			
1	9.74 775	19	9.82 926	27	0.17 074	9.91 849	8	59			
2	9.74 794	18	9.82 953	27	0.17 047	9.91 840	8	58			
3	9.74 812	19	9.82 980	28	0.17 020	9.91 832	9	57			
4	9.74 831	19	9.83 008	27	0.16 992	9.91 823	8	56			
5	9.74 850	18	9.83 035	27	0.16 965	9.91 815	9	55			
6	9.74 868	19	9.83 062	27	0.16 938	9.91 806	8	54			
7	9.74 887	19	9.83 089	28	0.16 911	9.91 798	9	53			
8	9.74 906	18	9.83 117	27	0.16 883	9.91 789	8	52		28	27	26
9	9.74 924	19	9.83 144	27	0.16 856	9.91 781	9	51	6	2.8	2.7	2.6
10	9.74 943	18	9.83 171	27	0.16 829	9.91 772	9	50	7	3.3	3.2	3.0
11	9.74 961	19	9.83 198	27	0.16 802	9.91 763	8	49	8	3.7	3.6	3.5
12	9.74 980	19	9.83 225	27	0.16 775	9.91 755	9	48	9	4.2	4.0	3.9
13	9.74 999	18	9.83 252	28	0.16 748	9.91 746	8	47	10	4.7	4.5	4.3
14	9.75 017	19	9.83 280	27	0.16 720	9.91 738	9	46	20	9.3	9.0	8.7
15	9.75 036	18	9.83 307	27	0.16 693	9.91 729	9	45	30	14.0	13.5	13.0
16	9.75 054	19	9.83 334	27	0.16 666	9.91 720	8	44	40	18.7	18.0	17.3
17	9.75 073	18	9.83 361	27	0.16 639	9.91 712	9	43	50	23.3	22.5	21.7
18	9.75 091	19	9.83 388	27	0.16 612	9.91 703	8	42			
19	9.75 110	18	9.83 415	27	0.16 585	9.91 695	9	41			
20	9.75 128	19	9.83 442	28	0.16 558	9.91 686	9	40			
21	9.75 147	18	9.83 470	27	0.16 530	9.91 677	8	39			
22	9.75 165	19	9.83 497	27	0.16 503	9.91 669	9	38			
23	9.75 184	18	9.83 524	27	0.16 476	9.91 660	9	37			
24	9.75 202	19	9.83 551	27	0.16 449	9.91 651	8	36			
25	9.75 221	18	9.83 578	27	0.16 422	9.91 643	9	35		19	18
26	9.75 239	19	9.83 605	27	0.16 395	9.91 634	9	34	6	1.9	1.8
27	9.75 258	18	9.83 632	27	0.16 368	9.91 625	8	33	7	2.2	2.1
28	9.75 276	18	9.83 659	27	0.16 341	9.91 617	9	32	8	2.5	2.4
29	9.75 294	19	9.83 686	27	0.16 314	9.91 608	9	31	9	2.8	2.7
30	9.75 313	18	9.83 713	27	0.16 287	9.91 599	8	30	10	3.2	3.0
31	9.75 331	19	9.83 740	28	0.16 260	9.91 591	9	29	20	6.3	6.0
32	9.75 350	18	9.83 768	27	0.16 232	9.91 582	9	28	30	9.5	9.0
33	9.75 368	18	9.83 795	27	0.16 205	9.91 573	8	27	40	12.7	12.0
34	9.75 386	19	9.83 822	27	0.16 178	9.91 565	9	26	50	15.8	15.0
35	9.75 405	18	9.83 849	27	0.16 151	9.91 556	9	25			
36	9.75 423	18	9.83 876	27	0.16 124	9.91 547	9	24			
37	9.75 441	18	9.83 903	27	0.16 097	9.91 538	8	23			
38	9.75 459	19	9.83 930	27	0.16 070	9.91 530	9	22			
39	9.75 478	18	9.83 957	27	0.16 043	9.91 521	9	21			
40	9.75 496	18	9.83 984	27	0.16 016	9.91 512	8	20			
41	9.75 514	19	9.84 011	27	0.15 989	9.91 504	9	19			
42	9.75 533	18	9.84 038	27	0.15 962	9.91 495	9	18			
43	9.75 551	18	9.84 065	27	0.15 935	9.91 486	9	17		9	8
44	9.75 569	18	9.84 092	27	0.15 908	9.91 477	8	16	6	0.9	0.8
45	9.75 587	18	9.84 119	27	0.15 881	9.91 469	9	15	7	1.0	0.9
46	9.75 605	19	9.84 146	27	0.15 854	9.91 460	9	14	8	1.2	1.1
47	9.75 624	18	9.84 173	27	0.15 827	9.91 451	9	13	9	1.4	1.2
48	9.75 642	18	9.84 200	27	0.15 800	9.91 442	9	12	10	1.5	1.3
49	9.75 660	18	9.84 227	27	0.15 773	9.91 433	8	11	20	3.0	2.7
50	9.75 678	18	9.84 254	26	0.15 746	9.91 425	9	10	30	4.5	4.0
51	9.75 696	18	9.84 280	27	0.15 720	9.91 416	9	9	40	6.0	5.3
52	9.75 714	19	9.84 307	27	0.15 693	9.91 407	9	8	50	7.5	6.7
53	9.75 733	18	9.84 334	27	0.15 666	9.91 398	9	7			
54	9.75 751	18	9.84 361	27	0.15 639	9.91 389	8	6			
55	9.75 769	18	9.84 388	27	0.15 612	9.91 381	9	5			
56	9.75 787	18	9.84 415	27	0.15 585	9.91 372	9	4			
57	9.75 805	18	9.84 442	27	0.15 558	9.91 363	9	3			
58	9.75 823	18	9.84 469	27	0.15 531	9.91 354	9	2			
59	9.75 841	18	9.84 496	27	0.15 504	9.91 345	9	1			
60	9.75 859		9.84 523		0.15 477	9.91 336		0			
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.		
0	9.75 859	18	9.84 523	27	0.15 477	9.91 336.	8	60			
1	9.75 877	18	9.84 550	26	0.15 450	9.91 328	9	59			
2	9.75 895	18	9.84 576	27	0.15 424	9.91 319	9	58			
3	9.75 913	18	9.84 603	27	0.15 397	9.91 310	9	57			
4	9.75 931	18	9.84 630	27	0.15 370	9.91 301	9	56			
5	9.75 949	18	9.84 657	27	0.15 343	9.91 292	9	55			
6	9.75 967	18	9.84 684	27	0.15 316	9.91 283	9	54			
7	9.75 985	18	9.84 711	27	0.15 289	9.91 274	8	53		**27**	**26**	**18**
8	9.76 003	18	9.84 738	26	0.15 262	9.91 266	9	52		27	26	18
9	9.76 021	18	9.84 764	27	0.15 236	9.91 257	9	51	6	2.7	2.6	1.8
10	9.76 039	18	9.84 791	27	0.15 209	9.91 248	9	50	7	3.2	3.0	2.1
11	9.76 057	18	9.84 818	27	0.15 182	9.91 239	9	49	8	3.6	3.5	2.4
12	9.76 075	18	9.84 845	27	0.15 155	9.91 230	9	48	9	4.1	3.9	2.7
13	9.76 093	18	9.84 872	27	0.15 128	9.91 221	9	47	10	4.5	4.3	3.0
14	9.76 111	18	9.84 899	26	0.15 101	9.91 212	9	46	20	9.0	8.7	6.0
15	9.76 129	17	9.84 925	27	0.15 075	9.91 203	9	45	30	13.5	13.0	9.0
16	9.76 146	18	9.84 952	27	0.15 048	9.91 194	9	44	40	18.0	17.3	12.0
17	9.76 164	18	9.84 979	27	0.15 021	9.91 185	9	43	50	22.5	21.7	15.0
18	9.76 182	18	9.85 006	27	0.14 994	9.91 176	9	42			
19	9.76 200	18	9.85 033	26	0.14 967	9.91 167	9	41			
20	9.76 218	18	9.85 059	27	0.14 941	9.91 158	9	40			
21	9.76 236	17	9.85 086	27	0.14 914	9.91 149	8	39			
22	9.76 253	18	9.85 113	27	0.14 887	9.91 141	9	38			
23	9.76 271	18	9.85 140	26	0.14 860	9.91 132	9	37			
24	9.76 289	18	9.85 166	27	0.14 834	9.61 123	9	36			
25	9.76 307	17	9.85 193	27	0.14 807	9.91 114	9	35		**17**	**10**
26	9.76 324	18	9.85 220	27	0.14 780	9.91 105	9	34		17	10
27	9.76 342	18	9.85 247	26	0.14 753	9.91 096	9	33	6	1.7	1.0
28	9.76 360	18	9.85 273	27	0.14 727	9.91 087	9	32	7	2.0	1.2
29	9.76 378	17	9.85 300	27	0.14 700	9.91 078	9	31	8	2.3	1.3
30	9.76 395	18	9.85 327	27	0.14 673	9.91 069	9	30	9	2.6	1.5
31	9.76 413	18	9.85 354	26	0.14 646	9.91 060	9	29	10	2.8	1.7
32	9.76 431	17	9.85 380	27	0.14 620	9.91 051	9	28	20	5.7	3.3
33	9.76 448	18	9.85 407	27	0.14 593	9.91 042	9	27	30	8.5	5.0
34	9.76 466	18	9.85 434	26	0.14 566	9.91 033	10	26	40	11.3	6.7
35	9.76 484	17	9.85 460	27	0.14 540	9.91 023	9	25	50	14.2	8.3
36	9.76 501	18	9.85 487	27	0.14 513	9.91 014	9	24			
37	9.76 519	18	9.85 514	26	0.14 486	9.91 005	9	23			
38	9.76 537	17	9.85 540	27	0.14 460	9.90 996	9	22			
39	9.76 554	18	9.85 567	27	0.14 433	9.90 987	9	21			
40	9.76 572	18	9.85 594	26	0.14 406	9.90 978	9	20			
41	9.76 590	17	9.85 620	27	0.14 380	9.90 969	9	19			
42	9.76 607	18	9.85 647	27	0.14 353	9.90 960	9	18			
43	9.76 625	17	9.85 674	26	0.14 326	9.90 951	9	17		**9**	**8**
44	9.76 642	18	9.85 700	27	0.14 300	9.90 942	9	16		9	8
45	9.76 660	17	9.85 727	27	0.14 273	9.90 933	9	15	6	0.9	0.8
46	9.76 677	18	9.85 754	26	0.14 246	9.90 924	9	14	7	1.1	0.9
47	9.76 695	17	9.85 780	27	0.14 220	9.90 915	9	13	8	1.2	1.1
48	9.76 712	18	9.85 807	27	0.14 193	9.90 906	10	12	9	1.4	1.2
49	9.76 730	17	9.85 834	26	0.14 166	9.90 896	9	11	10	1.5	1.3
50	9.76 747	18	9.85 860	27	0.14 140	9.90 887	9	10	20	3.0	2.7
51	9.76 765	17	9.85 887	26	0.14 113	9.90 878	9	9	30	4.5	4.0
52	9.76 782	18	9.85 913	27	0.14 087	9.90 869	9	8	40	6.0	5.3
53	9.76 800	17	9.85 940	27	0.14 060	9.90 860	9	7	50	7.5	6.7
54	9.76 817	18	9.85 967	26	0.14 033	9.90 851	9	6			
55	9.76 835	17	9.85 993	27	0.14 007	9.90 842	10	5			
56	9.76 852	18	9.86 020	26	0.13 980	9.90 832	9	4			
57	9.76 870	17	9.86 046	27	0.13 954	9.90 823	9	3			
58	9.76 887	17	9.86 073	27	0.13 927	9.90 814	9	2			
59	9.76 904	18	9.86 100	26	0.13 900	9.90 805	9	1			
60	9.76 922		9.86 126		0.13 874	9.90 796		0			
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.
0	9.76 922		9.86 126		0.13 874	9.90 796		**60**	
1	9.76 939	17	9.86 153	27	0.13 847	9.90 787	9	59	
2	9.76 957	18	9.86 179	26	0.13 821	9.90 777	10	58	
3	9.76 974	17	9.86 206	26	0.13 794	9.90 768	9	57	
4	9.76 991	17	9.86 232	26	0.13 768	9.90 759	9	56	
5	9.77 009	18	9.86 259	27	0.13 741	9.90 750	9	55	
6	9.77 026	17	9.86 285	26	0.13 715	9.90 741	9	54	
7	9.77 043	17	9.86 312	27	0.13 688	9.90 731	10	53	
8	9.77 061	18	9.86 338	26	0.13 662	9.90 722	9	52	27 / 26 / 18
9	9.77 078	17	9.86 365	27	0.13 635	9.90 713	9	51	
10	9.77 095	17	9.86 392	26	0.13 608	9.90 704	9	**50**	
11	9.77 112	17	9.86 418	27	0.13 582	9.90 694	10	49	
12	9.77 130	18	9.86 445	26	0.13 555	9.90 685	9	48	
13	9.77 147	17	9.86 471	27	0.13 529	9.90 676	9	47	
14	9.77 164	17	9.86 498	26	0.13 502	9.90 667	9	46	
15	9.77 181	17	9.86 524	27	0.13 476	9.90 657	10	45	
16	9.77 199	18	9.86 551	26	0.13 449	9.90 648	9	44	
17	9.77 216	17	9.86 577	26	0.13 423	9.90 639	9	43	
18	9.77 233	17	9.86 603	27	0.13 397	9.90 630	9	42	
19	9.77 250	17	9.86 630	26	0.13 370	9.90 620	10	41	
20	9.77 268	18	9.86 656	27	0.13 344	9.90 611	9	**40**	
21	9.77 285	17	9.86 683	26	0.13 317	9.90 602	9	39	
22	9.77 302	17	9.86 709	27	0.13 291	9.90 592	10	38	
23	9.77 319	17	9.86 736	26	0.13 264	9.90 583	9	37	
24	9.77 336	17	9.86 762	27	0.13 238	9.90 574	9	36	
25	9.77 353	17	9.86 789	26	0.13 211	9.90 565	9	35	
26	9.77 370	17	9.86 815	27	0.13 185	9.90 555	10	34	17 / 16
27	9.77 387	17	9.86 842	26	0.13 158	9.90 546	9	33	
28	9.77 405	18	9.86 868	26	0.13 132	9.90 537	9	32	
29	9.77 422	17	9.86 894	27	0.13 106	9.90 527	10	31	
30	9.77 439	17	9.86 921	26	0.13 079	9.90 518	9	**30**	
31	9.77 456	17	9.86 947	27	0.13 053	9.90 509	9	29	
32	9.77 473	17	9.86 974	26	0.13 026	9.90 499	10	28	
33	9.77 490	17	9.87 000	27	0.13 000	9.90 490	9	27	
34	9.77 507	17	9.87 027	26	0.12 973	9.90 480	10	26	
35	9.77 524	17	9.87 053	26	0.12 947	9.90 471	9	25	
36	9.77 541	17	9.87 079	27	0.12 921	9.90 462	9	24	
37	9.77 558	17	9.87 106	26	0.12 894	9.90 452	10	23	
38	9.77 575	17	9.87 132	26	0.12 868	9.90 443	9	22	
39	9.77 592	17	9.87 158	27	0.12 842	9.90 434	9	21	
40	9.77 609	17	9.87 185	26	0.12 815	9.90 424	10	**20**	
41	9.77 626	17	9.87 211	27	0.12 789	9.90 415	9	19	
42	9.77 643	17	9.87 238	26	0.12 762	9.90 405	10	18	
43	9.77 660	17	9.87 264	26	0.12 736	9.90 396	9	17	10 / 9
44	9.77 677	17	9.87 290	27	0.12 710	9.90 386	10	16	
45	9.77 694	17	9.87 317	26	0.12 683	9.90 377	9	15	
46	9.77 711	17	9.87 343	26	0.12 657	9.90 368	9	14	
47	9.77 728	16	9.87 369	27	0.12 631	9.90 358	10	13	
48	9.77 744	17	9.87 396	26	0.12 604	9.90 349	9	12	
49	9.77 761	17	9.87 422	26	0.12 578	9.90 339	10	11	
50	9.77 778	17	9.87 448	27	0.12 552	9.90 330	9	**10**	
51	9.77 795	17	9.87 475	26	0.12 525	9.90 320	10	9	
52	9.77 812	17	9.87 501	26	0.12 499	9.90 311	9	8	
53	9.77 829	17	9.87 527	27	0.12 473	9.90 301	10	7	
54	9.77 846	16	9.87 554	26	0.12 446	9.90 292	9	6	
55	9.77 862	17	9.87 580	26	0.12 420	9.90 282	10	5	
56	9.77 879	17	9.87 606	27	0.12 394	9.90 273	9	4	
57	9.77 896	17	9.87 633	26	0.12 367	9.90 263	10	3	
58	9.77 913	17	9.87 659	26	0.12 341	9.90 254	10	2	
59	9.77 930	16	9.87 685	26	0.12 315	9.90 244	9	1	
60	9.77 946		9.87 711		0.12 289	9.90 235		**0**	

| | L Cos | d | L Cot | c d | L Tan | L Sin | d | ′ | Prop. Pts. |

Prop. Pts.

	27	26	18
6	2.7	2.6	1.8
7	3.2	3.0	2.1
8	3.6	3.5	2.4
9	4.0	3.9	2.7
10	4.5	4.3	3.0
20	9.0	8.7	6.0
30	13.5	13.0	9.0
40	18.0	17.3	12.0
50	22.5	21.7	15.0

	17	16
6	1.7	1.6
7	2.0	1.9
8	2.3	2.1
9	2.6	2.4
10	2.8	2.7
20	5.7	5.3
30	8.5	8.0
40	11.3	10.7
50	14.2	13.3

	10	9
6	1.0	0.9
7	1.2	1.0
8	1.3	1.2
9	1.5	1.4
10	1.7	1.5
20	3.3	3.0
30	5.0	4.5
40	6.7	6.0
50	8.3	7.5

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.
0	9.77 946	17	9.87 711	27	0.12 289	9.90 235	10	60	
1	9.77 963	17	9.87 738	26	0.12 262	9.90 225	9	59	
2	9.77 980	17	9.87 764	26	0.12 236	9.90 216	10	58	
3	9.77 997	16	9.87 790	27	0.12 210	9.90 206	9	57	
4	9.78 013	17	9.87 817	26	0.12 183	9.90 197	10	56	
5	9.78 030	17	9.87 843	26	0.12 157	9.90 187	9	55	
6	9.78 047	16	9.87 869	26	0.12 131	9.90 178	10	54	
7	9.78 063	17	9.87 895	27	0.12 105	9.90 168	9	53	
8	9.78 080	17	9.87 922	26	0.12 078	9.90 159	10	52	
9	9.78 097	16	9.87 948	26	0.12 052	9.90 149	10	51	
10	9.78 113	17	9.87 974	26	0.12 026	9.90 139	9	50	
11	9.78 130	17	9.88 000	27	0.12 000	9.90 130	10	49	
12	9.78 147	16	9.88 027	26	0.11 973	9.90 120	9	48	
13	9.78 163	17	9.88 053	26	0.11 947	9.90 111	10	47	
14	9.78 180	17	9.88 079	26	0.11 921	9.90 101	10	46			27	26	17
15	9.78 197	16	9.88 105	26	0.11 895	9.90 091	9	45	6	2.7	2.6	1.7
16	9.78 213	17	9.88 131	27	0.11 869	9.90 082	10	44	7	3.2	3.0	2.0
17	9.78 230	16	9.88 158	26	0.11 842	9.90 072	9	43	8	3.6	3.5	2.3
18	9.78 246	17	9.88 184	26	0.11 816	9.90 063	10	42	9	4.0	3.9	2.6
19	9.78 263	17	9.88 210	26	0.11 790	9.90 053	10	41	10	4.5	4.3	2.8
20	9.78 280	16	9.88 236	26	0.11 764	9.90 043	9	40	20	9.0	8.7	5.7
21	9.78 296	17	9.88 262	27	0.11 738	9.90 034	10	39	30	13.5	13.0	8.5
22	9.78 313	16	9.88 289	26	0.11 711	9.90 024	10	38	40	18.0	17.3	11.3
23	9.78 329	17	9.88 315	26	0.11 685	9.90 014	9	37	50	22.5	21.7	14.2
24	9.78 346	16	9.88 341	26	0.11 659	9.90 005	10	36	
25	9.78 362	17	9.88 367	26	0.11 633	9.89 995	10	35	
26	9.78 379	16	9.88 393	27	0.11 607	9.89 985	9	34	
27	9.78 395	17	9.88 420	26	0.11 580	9.89 976	10	33	
28	9.78 412	16	9.88 446	26	0.11 554	9.89 966	10	32	
29	9.78 428	17	9.88 472	26	0.11 528	9.89 956	9	31	
30	9.78 445	16	9.88 498	26	0.11 502	9.89 947	10	30	
31	9.78 461	17	9.88 524	26	0.11 476	9.89 937	10	29	
32	9.78 478	16	9.88 550	27	0.11 450	9.89 927	9	28	
33	9.78 494	16	9.88 577	26	0.11 423	9.89 918	10	27	
34	9.78 510	17	9.88 603	26	0.11 397	9.89 908	10	26	
35	9.78 527	16	9.88 629	26	0.11 371	9.89 898	10	25	
36	9.78 543	17	9.88 655	26	0.11 345	9.89 888	9	24			16	10	9
37	9.78 560	16	9.88 681	26	0.11 319	9.89 879	10	23	6	1.6	1.0	0.9
38	9.78 576	16	9.88 707	26	0.11 293	9.89 869	10	22	7	1.9	1.2	1.0
39	9.78 592	17	9.88 733	26	0.11 267	9.89 859	10	21	8	2.1	1.3	1.2
40	9.78 609	16	9.88 759	27	0.11 241	9.89 849	9	20	9	2.4	1.5	1.4
41	9.78 625	17	9.88 786	26	0.11 214	9.89 840	10	19	10	2.7	1.7	1.5
42	9.78 642	16	9.88 812	26	0.11 188	9.89 830	10	18	20	5.3	3.3	3.0
43	9.78 658	16	9.88 838	26	0.11 162	9.89 820	10	17	30	8.0	5.0	4.5
44	9.78 674	17	9.88 864	26	0.11 136	9.89 810	9	16	40	10.7	6.7	6.0
45	9.78 691	16	9.88 890	26	0.11 110	9.89 801	10	15	50	13.3	8.3	7.5
46	9.78 707	16	9.88 916	26	0.11 084	9.89 791	10	14	
47	9.78 723	16	9.88 942	26	0.11 058	9.89 781	10	13	
48	9.78 739	17	9.88 968	26	0.11 032	9.89 771	10	12	
49	9.78 756	16	9.88 994	26	0.11 006	9.89 761	9	11	
50	9.78 772	16	9.89 020	26	0.10 980	9.89 752	10	10	
51	9.78 788	17	9.89 046	27	0.10 954	9.89 742	10	9	
52	9.78 805	16	9.89 073	26	0.10 927	9.89 732	10	8	
53	9.78 821	16	9.89 099	26	0.10 901	9.89 722	10	7	
54	9.78 837	16	9.89 125	26	0.10 875	9.89 712	10	6	
55	9.78 853	16	9.89 151	26	0.10 849	9.89 702	9	5	
56	9.78 869	17	9.89 177	26	0.10 823	9.89 693	10	4	
57	9.78 886	16	9.89 203	26	0.10 797	9.89 683	10	3	
58	9.78 902	16	9.89 229	26	0.10 771	9.89 673	10	2	
59	9.78 918	16	9.89 255	26	0.10 745	9.89 663	10	1	
60	9.78 934		9.89 281		0.10 719	9.89 653		0	
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.
0	9.78 934	16	9.89 281	26	0.10 719	9.89 653	10	60	
1	9.78 950	17	9.89 307	26	0.10 693	9.89 643	10	59	
2	9.78 967	16	9.89 333	26	0.10 667	9.89 633	10	58	
3	9.78 983	16	9.89 359	26	0.10 641	9.89 624	9	57	
4	9.78 999	16	9.89 385	26	0.10 615	9.89 614	10	56	
5	9.79 015	16	9.89 411	26	0.10 589	9.89 604	10	55	
6	9.79 031	16	9.89 437	26	0.10 563	9.89 594	10	54	
7	9.79 047	16	9.89 463	26	0.10 537	9.89 584	10	53	
8	9.79 063	16	9.89 489	26	0.10 511	9.89 574	10	52	
9	9.79 079	16	9.89 515	26	0.10 485	9.89 564	10	51	
10	9.79 095	16	9.89 541	26	0.10 459	9.89 554	10	50	
11	9.79 111	17	9.89 567	26	0.10 433	9.89 544	10	49	
12	9.79 128	16	9.89 593	26	0.10 407	9.89 534	10	48	
13	9.79 144	16	9.89 619	26	0.10 381	9.89 524	10	47	
14	9.79 160	16	9.89 645	26	0.10 355	9.89 514	10	46	
15	9.79 176	16	9.89 671	26	0.10 329	9.89 504	9	45	
16	9.79 192	16	9.89 697	26	0.10 303	9.89 495	10	44	
17	9.79 208	16	9.89 723	26	0.10 277	9.89 485	10	43	
18	9.79 224	16	9.89 749	26	0.10 251	9.89 475	10	42	
19	9.79 240	16	9.89 775	26	0.10 225	9.89 465	10	41	
20	9.79 256	16	9.89 801	26	0.10 199	9.89 455	10	40	
21	9.79 272	16	9.89 827	26	0.10 173	9.89 445	10	39	
22	9.79 288	16	9.89 853	26	0.10 147	9.89 435	10	38	
23	9.79 304	15	9.89 879	26	0.10 121	9.89 425	10	37	
24	9.79 319	16	9.89 905	26	0.10 095	9.89 415	10	36	
25	9.79 335	16	9.89 931	26	0.10 069	9.89 405	10	35	
26	9.79 351	16	9.89 957	26	0.10 043	9.89 395	10	34	
27	9.79 367	16	9.89 983	26	0.10 017	9.89 385	10	33	
28	9.79 383	16	9.90 009	26	0.09 991	9.89 375	11	32	
29	9.79 399	16	9.90 035	26	0.09 965	9.89 364	10	31	
30	9.79 415	16	9.90 061	25	0.09 939	9.89 354	10	30	
31	9.79 431	16	9.90 086	26	0.09 914	9.89 344	10	29	
32	9.79 447	16	9.90 112	26	0.09 888	9.89 334	10	28	
33	9.79 463	15	9.90 138	26	0.09 862	9.89 324	10	27	
34	9.79 478	16	9.90 164	26	0.09 836	9.89 314	10	26	
35	9.79 494	16	9.90 190	26	0.09 810	9.89 304	10	25	
36	9.79 510	16	9.90 216	26	0.09 784	9.89 294	10	24	
37	9.79 526	16	9.90 242	26	0.09 758	9.89 284	10	23	
38	9.79 542	16	9.90 268	26	0.09 732	9.89 274	10	22	
39	9.79 558	15	9.90 294	26	0.09 706	9.89 264	10	21	
40	9.79 573	16	9.90 320	26	0.09 680	9.89 254	10	20	
41	9.79 589	16	9.90 346	25	0.09 654	9.89 244	11	19	
42	9.79 605	16	9.90 371	26	0.09 629	9.89 233	10	18	
43	9.79 621	15	9.90 397	26	0.09 603	9.89 223	10	17	
44	9.79 636	16	9.90 423	26	0.09 577	9.89 213	10	16	
45	9.79 652	16	9.90 449	26	0.03 551	9.89 203	10	15	
46	9.79 668	16	9.90 475	26	0.09 525	9.89 193	10	14	
47	9.79 684	15	9.90 501	26	0.09 499	9.89 183	10	13	
48	9.79 699	16	9.90 527	26	0.09 473	9.89 173	11	12	
49	9.79 715	16	9.90 553	25	0.09 447	9.89 162	11	11	
50	9.79 731	15	9.90 578	26	0.09 422	9.89 152	10	10	
51	9.79 746	16	9.90 604	26	0.09 396	9.89 142	10	9	
52	9.79 762	16	9.90 630	26	0.09 370	9.89 132	10	8	
53	9.79 778	15	9.90 656	26	0.09 344	9.89 122	10	7	
54	9.79 793	16	9.90 682	26	0.09 318	9.89 112	11	6	
55	9.79 809	16	9.90 708	26	0.09 292	9.89 101	10	5	
56	9.79 825	15	9.90 734	25	0.09 266	9.89 091	10	4	
57	9.79 840	16	9.90 759	26	0.09 241	9.89 081	10	3	
58	9.79 856	16	9.90 785	26	0.09 215	9.89 071	11	2	
59	9.79 872	15	9.90 811	26	0.09 189	9.89 060	10	1	
60	9.79 887		9.99 837		0.09 163	9.89 050		0	

Prop. Pts.

	26	25	17
6	2.6	2.5	1.7
7	3.0	2.9	2.0
8	3.5	3.3	2.3
9	3.9	3.8	2.6
10	4.3	4.2	2.8
20	8.7	8.3	5.7
30	13.0	12.5	8.5
40	17.3	16.7	11.3
50	21.7	20.8	14.2

	16	15	11
6	1.6	1.5	1.1
7	1.9	1.8	1.3
8	2.1	2.0	1.5
9	2.4	2.2	1.6
10	2.7	2.5	1.8
20	5.3	5.0	3.7
30	8.0	7.5	5.5
40	10.7	10.0	7.3
50	13.3	12.5	9.2

	10	9
6	1.0	0.9
7	1.2	1.0
8	1.3	1.2
9	1.5	1.4
10	1.7	1.5
20	3.3	3.0
30	5.0	4.5
40	6.7	6.0
50	8.3	7.5

	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.
0	9.79 887	16	9.90 837	26	0.09 163	9.89 050	10	60	
1	9.79 903	15	9.90 863	26	0.09 137	9.89 040	10	59	
2	9.79 918	16	9.90 889	25	0.09 111	9.89 030	10	58	
3	9.79 934	16	9.90 914	26	0.09 086	9.89 020	11	57	
4	9.79 950	15	9.90 940	26	0.09 060	9.89 009	10	56	
5	9.79 965	16	9.90 966	26	0.09 034	9.88 999	10	55	
6	9.79 981	15	9.90 992	26	0.09 008	9.88 989	11	54	
7	9.79 996	16	9.91 018	25	0.08 982	9.88 978	10	53	
8	9.80 012	15	9.91 043	26	0.08 957	9.88 968	10	52	
9	9.80 027	16	9.91 069	26	0.08 931	9.88 958	10	51	
10	9.80 043	15	9.91 095	26	0.08 905	9.88 948	11	50	
11	9.80 058	16	9.91 121	26	0.08 879	9.88 937	10	49	
12	9.80 074	15	9.91 147	25	0.08 853	9.88 927	10	48	
13	9.80 089	16	9.91 172	26	0.08 828	9.88 917	11	47	
14	9.80 105	15	9.91 198	26	0.08 802	9.88 906	10	46	
15	9.80 120	16	9.91 224	26	0.08 776	9.88 896	10	45	
16	9.80 136	15	9.91 250	26	0.08 750	9.88 886	11	44	
17	9.80 151	15	9.91 276	25	0.08 724	9.88 875	10	43	
18	9.80 166	16	9.91 301	26	0.08 699	9.88 865	10	42	
19	9.80 182	15	9.91 327	26	0.08 673	9.88 855	11	41	
20	9.80 197	16	9.91 353	26	0.08 647	9.88 844	10	40	
21	9.80 213	15	9.91 379	25	0.08 621	9.88 834	10	39	
22	9.80 228	16	9.91 404	26	0.08 596	9.88 824	11	38	
23	9.80 244	15	9.91 430	26	0.08 570	9.88 813	10	37	
24	9.80 259	15	9.91 456	26	0.08 544	9.88 803	10	36	
25	9.80 274	16	9.91 482	25	0.08 518	9.88 793	11	35	
26	9.80 290	15	9.91 507	26	0.08 493	9.88 782	10	34	
27	9.80 305	15	9.91 533	26	0.08 467	9.88 772	11	33	
28	9.80 320	16	9.91 559	26	0.08 441	9.88 761	10	32	
29	9.80 336	15	9.91 585	25	0.08 415	9.88 751	10	31	
30	9.80 351	15	9.91 610	26	0.08 390	9.88 741	11	30	
31	9.80 366	16	9.91 636	26	0.08 364	9.88 730	10	29	
32	9.80 382	15	9.91 662	26	0.08 338	9.88 720	11	28	
33	9.80 397	15	9.91 688	25	0.08 312	9.88 709	10	27	
34	9.80 412	16	9.91 713	26	0.08 287	9.88 699	11	26	
35	9.80 428	15	9.91 739	26	0.08 261	9.88 688	10	25	
36	9.80 443	15	9.91 765	26	0.08 235	9.88 678	10	24	
37	9.80 458	15	9.91 791	25	0.08 209	9.88 668	11	23	
38	9.80 473	16	9.91 816	26	0.08 184	9.88 657	10	22	
39	9.80 489	15	9.91 842	26	0.08 158	9.88 647	11	21	
40	9.80 504	15	9.91 868	25	0.08 132	9.88 636	10	20	
41	9.80 519	15	9.91 893	26	0.08 107	9.88 626	11	19	
42	9.80 534	16	9.91 919	26	0.08 081	9.88 615	10	18	
43	9.80 550	15	9.91 945	26	0.08 055	9.88 605	11	17	
44	9.80 565	15	9.91 971	25	0.08 029	9.88 594	10	16	
45	9.80 580	15	9.91 996	26	0.08 004	9.88 584	11	15	
46	9.80 595	15	9.92 022	26	0.07 978	9.88 573	10	14	
47	9.80 610	15	9.92 048	25	0.07 952	9.88 563	11	13	
48	9.80 625	16	9.92 073	26	0.07 927	9.88 552	10	12	
49	9.80 641	15	9.92 099	26	0.07 901	9.88 542	11	11	
50	9.80 656	15	9.92 125	25	0.07 875	9.88 531	10	10	
51	9.80 671	15	9.92 150	26	0.07 850	9.88 521	11	9	
52	9.80 686	15	9.92 176	26	0.07 824	9.88 510	11	8	
53	9.80 701	15	9.92 202	25	0.07 798	9.88 499	10	7	
54	9.80 716	15	9.92 227	26	0.07 773	9.88 489	11	6	
55	9.80 731	15	9.92 253	26	0.07 747	9.88 478	10	5	
56	9.80 746	16	9.92 279	25	0.07 721	9.88 468	11	4	
57	9.80 762	15	9.92 304	26	0.07 696	9.88 457	10	3	
58	9.80 777	15	9.92 330	26	0.07 670	9.88 447	11	2	
59	9.80 792	15	9.92 356	25	0.07 644	9.88 436	11	1	
60	9.80 807		9.92 381		0.07 619	9.88 425		0	
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

Prop. Pts.

	26	25	16
6	2.6	2.5	1.6
7	3.0	2.9	1.9
8	3.5	3.3	2.1
9	3.9	3.8	2.4
10	4.3	4.2	2.7
20	8.7	8.3	5.3
30	13.0	12.5	8.0
40	17.3	16.7	10.7
50	21.7	20.8	13.3

	15	11	10
6	1.5	1.1	1.0
7	1.8	1.3	1.2
8	2.0	1.5	1.3
9	2.2	1.6	1.5
10	2.5	1.8	1.7
20	5.0	3.7	3.3
30	7.5	5.5	5.0
40	10.0	7.3	6.7
50	12.5	9.2	8.3

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	′
0	9.80 807	15	9.92 381	26	0.07 619	9.88 425	10	60
1	9.80 822	15	9.92 407	26	0.07 593	9.88 415	11	59
2	9.80 837	15	9.92 433	25	0.07 567	9.88 404	10	58
3	9.80 852	15	9.92 458	26	0.07 542	9.88 394	11	57
4	9.80 867	15	9.92 484	26	0.07 516	9.88 383	11	56
5	9.80 882	15	9.92 510	25	0.07 490	9.88 372	10	55
6	9.80 897	15	9.92 535	26	0.07 465	9.88 362	11	54
7	9.80 912	15	9.92 561	26	0.07 439	9.88 351	11	53
8	9.80 927	15	9.92 587	25	0.07 413	9.88 340	10	52
9	9.80 942	15	9.92 612	26	0.07 388	9.88 330	11	51
10	9.80 957	15	9.92 638	25	0.07 362	9.88 319	11	50
11	9.80 972	15	9.92 663	26	0.07 337	9.88 308	10	49
12	9.80 987	15	9.92 689	26	0.07 311	9.88 298	11	48
13	9.81 002	15	9.92 715	25	0.07 285	9.88 287	11	47
14	9.81 017	15	9.92 740	26	0.07 260	9.88 276	10	46
15	9.81 032	15	9.92 766	26	0.07 234	9.88 266	11	45
16	9.81 047	14	9.92 792	25	0.07 208	9.88 255	11	44
17	9.81 061	15	9.92 817	26	0.07 183	9.88 244	10	43
18	9.81 076	15	9.92 843	25	0.07 157	9.88 234	11	42
19	9.81 091	15	9.92 868	26	0.07 132	9.88 223	11	41
20	9.81 106	15	9.92 894	26	0.07 106	9.88 212	11	40
21	9.81 121	15	9.92 920	25	0.07 080	9.88 201	11	39
22	9.81 136	15	9.92 945	26	0.07 055	9.88 191	11	38
23	9.81 151	15	9.92 971	25	0.07 029	9.88 180	11	37
24	9.81 166	14	9.92 996	26	0.07 004	9.88 169	11	36
25	9.81 180	15	9.93 022	26	0.06 978	9.88 158	10	35
26	9.81 195	15	9.93 048	25	0.06 952	9.88 148	11	34
27	9.81 210	15	9.93 073	26	0.06 927	9.88 137	11	33
28	9.81 225	15	9.93 099	25	0.06 901	9.88 126	11	32
29	9.81 240	14	9.93 124	26	0.06 876	9.88 115	10	31
30	9.81 254	15	9.93 150	25	0.06 850	9.88 105	11	30
31	9.81 269	15	9.93 175	26	0.06 825	9.88 094	11	29
32	9.81 284	15	9.93 201	26	0.06 799	9.88 083	11	28
33	9.81 299	15	9.93 227	25	0.06 773	9.88 072	11	27
34	9.81 314	14	9.93 252	26	0.06 748	9.88 061	10	26
35	9.81 328	15	9.93 278	25	0.06 722	9.88 051	11	25
36	9.81 343	15	9.93 303	26	0.06 697	9.88 040	11	24
37	9.81 358	14	9.93 329	25	0.06 671	9.88 029	11	23
38	9.81 372	15	9.93 354	26	0.06 646	9.88 018	11	22
39	9.81 387	15	9.93 380	26	0.06 620	9.88 007	11	21
40	9.81 402	15	9.93 406	25	0.06 594	9.87 996	11	20
41	9.81 417	14	9.93 431	26	0.06 569	9.87 985	10	19
42	9.81 431	15	9.93 457	25	0.06 543	9.87 975	11	18
43	9.81 446	15	9.93 482	26	0.06 518	9.87 964	11	17
44	9.81 461	14	9.93 508	25	0.06 492	9.87 953	11	16
45	9.81 475	15	9.93 533	26	0.06 467	9.87 942	11	15
46	9.81 490	15	9.93 559	25	0.06 441	9.87 931	11	14
47	9.81 505	14	9.93 584	26	0.06 416	9.87 920	11	13
48	9.81 519	15	9.93 610	26	0.06 390	9.87 909	11	12
49	9.81 534	15	9.93 636	25	0.06 364	9.87 898	11	11
50	9.81 549	14	9.93 661	26	0.06 339	9.87 887	10	10
51	9.81 563	15	9.93 687	25	0.06 313	9.87 877	11	9
52	9.81 578	14	9.93 712	26	0.06 288	9.87 866	11	8
53	9.81 592	15	9.93 738	25	0.06 262	9.87 855	11	7
54	9.81 607	15	9.93 763	26	0.06 237	9.87 844	11	6
55	9.81 622	14	9.93 789	25	0.06 211	9.87 833	11	5
56	9.81 636	15	9.93 814	26	0.06 186	9.87 822	11	4
57	9.81 651	14	9.93 840	25	0.06 160	9.87 811	11	3
58	9.81 665	15	9.93 865	26	0.06 135	9.87 800	11	2
59	9.81 680	14	9.93 891	26	0.06 109	9.87 789	11	1
60	9.81 694	14	9.93 916	25	0.06 084	9.87 778		0
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′

Prop. Pts.

	26	25	15
6	2.6	2.5	1.5
7	3.0	2.9	1.8
8	3.5	3.3	2.0
9	3.9	3.8	2.3
10	4.3	4.2	2.5
20	8.7	8.3	5.0
30	13.0	12.5	7.5
40	17.3	16.7	10.0
50	21.7	20.8	12.5

	14	11	10
6	1.4	1.1	1.0
7	1.6	1.3	1.2
8	1.9	1.5	1.3
9	2.1	1.7	1.5
10	2.3	1.8	1.7
20	4.7	3.7	3.3
30	7.0	5.5	5.0
40	9.3	7.3	6.7
50	11.7	9.2	8.3

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.		
0	9.81 694	15	9.93 916	26	0.06 084	9.87 778	11	**60**			
1	9.81 709	14	9.93 942	25	0.06 058	9.87 767	11	59			
2	9.81 723	15	9.93 967	26	0.06 033	9.87 756	11	58			
3	9.81 738	14	9.93 993	25	0.06 007	9.87 745	11	57			
4	9.81 752	15	9.94 018	26	0.05 982	9.87 734	11	56			
5	9.81 767	14	9.94 044	25	0.05 956	9.87 723	11	55			
6	9.81 781	15	9.94 069	26	0.05 931	9.87 712	11	54			
7	9.81 796	14	9.94 095	25	0.05 905	9.87 701	11	53			
8	9.81 810	15	9.94 120	26	0.05 880	9.87 690	11	52			
9	9.81 825	14	9.94 146	25	0.05 854	9.87 679	11	51			
10	9.81 839	15	9.94 171	26	0.05 829	9.87 668	11	**50**			
11	9.81 854	14	9.94 197	25	0.05 803	9.87 657	11	49			
12	9.81 868	14	9.94 222	26	0.05 778	9.87 646	11	48			
13	9.81 882	15	9.94 248	25	0.05 752	9.87 635	11	47		**26**	**25**	**15**
14	9.81 897	14	9.94 273	26	0.05 727	9.87 624	11	46				
15	9.81 911	15	9.94 299	25	0.05 701	9.87 613	12	45	6	2.6	2.5	1.5
16	9.81 926	14	9.94 324	26	0.05 676	9.87 601	11	44	7	3.0	2.9	1.8
17	9.81 940	15	9.94 350	25	0.05 650	9.87 590	11	43	8	3.5	3.3	2.0
18	9.81 955	14	9.94 375	26	0.05 625	9.87 579	11	42	9	3.9	3.8	2.3
19	9.81 969	14	9.94 401	25	0.05 599	9.87 568	11	41	10	4.3	4.2	2.5
20	9.81 983	15	9.94 426	26	0.05 574	9.87 557	11	**40**	20	8.7	8.3	5.0
21	9.81 998	14	9.94 452	25	0.05 548	9.87 546	11	39	30	13.0	12.5	7.5
22	9.82 012	14	9.94 477	26	0.05 523	9.87 535	11	38	40	17.3	16.7	10.0
23	9.82 026	15	9.94 503	25	0.05 497	9.87 524	11	37	50	21.7	20.8	12.5
24	9.82 041	14	9.94 528	26	0.05 472	9.87 513	12	36				
25	9.82 055	14	9.94 554	25	0.05 446	9.87 501	11	35				
26	9.82 069	15	9.94 579	26	0.05 421	9.87 490	11	34				
27	9.82 084	14	9.94 604	26	0.05 396	9.87 479	11	33				
28	9.82 098	14	9.94 630	25	0.05 370	9.87 468	11	32				
29	9.82 112	14	9.94 655	26	0.05 345	9.87 457	11	31				
30	9.82 126	15	9.94 681	25	0.05 319	9.87 446	12	**30**				
31	9.82 141	14	9.94 706	26	0.05 294	9.87 434	11	29				
32	9.82 155	14	9.94 732	25	0.05 268	9.87 423	11	28				
33	9.82 169	15	9.94 757	26	0.05 243	9.87 412	11	27				
34	9.82 184	14	9.94 783	25	0.05 217	9.87 401	11	26				
35	9.82 198	14	9.94 808	26	0.05 192	9.87 390	12	25				
36	9.82 212	14	9.94 834	25	0.05 166	9.87 378	11	24				
37	9.82 226	14	9.94 859	25	0.05 141	9.87 367	11	23		**14**	**12**	**11**
38	9.82 240	15	9.94 884	26	0.05 116	9.87 356	11	22				
39	9.82 255	14	9.94 910	25	0.05 090	9.87 345	11	21	6	1.4	1.2	1.1
40	9.82 269	14	9.94 935	26	0.05 065	9.87 334	12	**20**	7	1.6	1.4	1.3
41	9.82 283	14	9.94 961	25	0.05 039	9.87 322	11	19	8	1.9	1.6	1.5
42	9.82 297	14	9.94 986	26	0.05 014	9.87 311	11	18	9	2.1	1.8	1.7
43	9.82 311	15	9.95 012	25	0.04 988	9.87 300	12	17	10	2.3	2.0	1.8
44	9.82 326	14	9.95 037	25	0.04 963	9.87 288	11	16	20	4.7	4.0	3.7
45	9.82 340	14	9.95 062	26	0.04 938	9.87 277	11	15	30	7.0	6.0	5.5
46	9.82 354	14	9.95 088	25	0.04 912	9.87 266	11	14	40	9.3	8.0	7.3
47	9.82 368	14	9.95 113	26	0.04 887	9.87 255	12	13	50	11.7	10.0	9.2
48	9.82 382	14	9.95 139	25	0.04 861	9.87 243	11	12				
49	9.82 396	14	9.95 164	26	0.04 836	9.87 232	11	11				
50	9.82 410	14	9.95 190	25	0.04 810	9.87 221	12	**10**				
51	9.82 424	15	9.95 215	25	0.04 785	9.87 209	11	9				
52	9.82 439	14	9.95 240	26	0.04 760	9.87 198	11	8				
53	9.82 453	14	9.95 266	25	0.04 734	9.87 187	12	7				
54	9.82 467	14	9.95 291	26	0.04 709	9.87 175	11	6				
55	9.82 481	14	9.95 317	25	0.04 683	9.87 164	11	5				
56	9.82 495	14	9.95 342	26	0.04 658	9.87 153	12	4				
57	9.82 509	14	9.95 368	25	0.04 632	9.87 141	11	3				
58	9.82 523	14	9.95 393	25	0.04 607	9.87 130	11	2				
59	9.82 537	14	9.95 418	26	0.04 582	9.87 119	12	1				
60	9.82 551		9.95 444		0.04 556	9.87 107		**0**				
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.		
0	9.82 551	14	9.95 444	25	0.04 556	9.87 107	11	60			
1	9.82 565	14	9.95 469	26	0.04 531	9.87 096	11	59			
2	9.82 579	14	9.95 495	25	0.04 505	9.87 085	11	58			
3	9.82 593	14	9.95 520	25	0.04 480	9.87 073	12	57			
4	9.82 607	14	9.95 545	26	0.04 455	9.87 062	11	56			
5	9.82 621	14	9.95 571	25	0.04 429	9.87 050	12	55			
6	9.82 635	14	9.95 596	26	0.04 404	9.87 039	11	54			
7	9.82 649	14	9.95 622	25	0.04 378	9.87 028	12	53			
8	9.82 663	14	9.95 647	25	0.04 353	9.87 016	11	52			
9	9.82 677	14	9.95 672	26	0.04 328	9.87 005	12	51			
10	9.82 691	14	9.95 698	25	0.04 302	9.86 993	11	50			
11	9.82 705	14	9.95 723	25	0.04 277	9.86 982	12	49			
12	9.82 719	14	9.95 748	26	0.04 252	9.86 970	11	48			
13	9.82 733	14	9.95 774	25	0.04 226	9.86 959	12	47			
14	9.82 747	14	9.95 799	26	0.04 201	9.86 947	11	46		26	25	14
15	9.82 761	14	9.95 825	25	0.04 175	9.86 936	12	45	6	2.6	2.5	1.4
16	9.82 775	13	9.95 850	25	0.04 150	9.86 924	11	44	7	3.0	2.9	1.6
17	9.82 788	14	9.95 875	26	0.04 125	9.86 913	12	43	8	3.5	3.3	1.9
18	9.82 802	14	9.95 901	25	0.04 099	9.86 902	12	42	9	3.9	3.8	2.1
19	9.82 816	14	9.95 926	26	0.04 074	9.86 890	11	41	10	4.3	4.2	2.3
20	9.82 830	14	9.95 952	25	0.04 048	9.86 879	12	40	20	8.7	8.3	4.7
21	9.82 844	14	9.95 977	25	0.04 023	9.86 867	12	39	30	13.0	12.5	7.0
22	9.82 858	14	9.96 002	26	0.03 998	9.86 855	11	38	40	17.3	16.7	9.3
23	9.82 872	13	9.96 028	25	0.03 972	9.86 844	12	37	50	21.7	20.8	11.7
24	6.82 885	14	9.96 053	25	0.03 947	9.86 832	11	36			
25	9.82 899	14	9.96 078	26	0.03 922	9.86 821	12	35			
26	9.82 913	14	9.96 104	25	0.03 896	9.86 809	11	34			
27	9.82 927	14	9.96 129	26	0.03 871	9.86 798	12	33			
28	9.82 941	14	9.96 155	25	0.03 845	9.86 786	11	32			
29	9.82 955	13	9.96 180	25	0.03 820	9.86 775	12	31			
30	9.82 968	14	9.96 205	26	0.03 795	9.86 763	11	30			
31	9.82 982	14	9.96 231	25	0.93 769	9.86 752	12	29			
32	9.82 996	14	9.96 256	25	0.03 744	9.86 740	12	28			
33	9.83 010	13	9.96 281	26	0.03 719	9.86 728	11	27			
34	9.83 023	14	9.96 307	25	0.03 693	9.86 717	12	26			
35	9.83 037	14	9.96 332	25	0.03 668	9.86 705	11	25			
36	9.83 051	14	9.96 357	26	0.03 643	9.86 694	12	24			
37	9.83 065	13	9.96 383	25	0.03 617	9.86 682	12	23		13	12	11
38	9.83 078	14	9.96 408	25	0.03 592	9.86 670	11	22	6	1.3	1.2	1.1
39	9.83 092	14	9.96 433	26	0.03 567	9.86 659	12	21	7	1.5	1.4	1.3
40	9.83 106	14	9.96 459	25	0.03 541	9.86 647	12	20	8	1.7	1.6	1.5
41	9.83 120	13	9.96 484	26	0.03 516	9.86 635	11	19	9	2.0	1.8	1.6
42	9.83 133	14	9.96 510	25	0.03 490	9.86 624	12	18	10	2.2	2.0	1.8
43	9.83 147	14	9.96 535	25	0.03 465	9.86 612	12	17	20	4.3	4.0	3.7
44	9.83 161	13	9.96 560	26	0.03 440	9.86 600	11	16	30	6.5	6.0	5.5
45	9.83 174	14	9.96 586	25	0.03 414	9.86 589	12	15	40	8.7	8.0	7.3
46	9.83 188	14	9.96 611	25	0.03 389	9.86 577	12	14	50	10.8	10.0	9.2
47	9.83 202	13	9.96 636	26	0.03 364	9.86 565	11	13			
48	9.83 215	14	9.96 662	25	0.03 338	9.86 554	12	12			
49	9.83 229	13	9.96 687	25	0.03 313	9.86 542	12	11			
50	9.83 242	14	9.96 712	26	0.03 288	9.86 530	12	10			
51	9.83 256	14	9.96 738	25	0.03 262	9.86 518	11	9			
52	9.83 270	13	9.96 763	25	0.03 237	9.86 507	12	8			
53	9.83 283	14	9.96 788	26	0.03 212	9.86 495	12	7			
54	9.83 297	13	9.96 814	25	0.03 186	9.86 483	11	6			
55	9.83 310	14	9.96 839	25	0.03 161	9.86 472	12	5			
56	9.83 324	14	9.96 864	26	0.03 136	9.86 460	12	4			
57	9.83 338	13	9.96 890	25	0.03 110	9.86 448	12	3			
58	9.83 351	14	9.96 915	25	0.03 085	9.86 436	11	2			
59	9.83 365	13	9.96 940	26	0.03 060	9.86 425	12	1			
60	9.83 378	13	9.96 966		0.03 034	9.86 413	12	0			
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.		

′	L Sin	d	L Tan	c d	L Cot	L Cos	d	′	Prop. Pts.
0	9.83 378	14	9.96 966	25	0.03 034	9.86 413	12	60	
1	9.83 392	13	9.96 991	25	0.03 009	9.86 401	12	59	
2	9.83 405	14	9.97 016	26	0.02 984	9.86 389	12	58	
3	9.83 419	13	9.97 042	25	0.02 958	9.86 377	11	57	
4	9.83 432	14	9.97 067	25	0.02 933	9.86 366	12	56	
5	9.83 446	13	9.97 092	26	0.02 908	9.86 354	12	55	
6	9.83 459	14	9.97 118	25	0.02 882	9.86 342	12	54	
7	9.83 473	13	9.97 143	25	0.02 857	9.86 330	12	53	
8	9.83 486	14	9.97 168	25	0.02 832	9.86 318	12	52	
9	9.83 500	13	9.97 193	26	0.02 807	9.86 306	11	51	
10	9.83 513	14	9.97 219	25	0.02 781	9.86 295	12	50	
11	9.83 527	13	9.97 244	25	0.02 756	9.86 283	12	49	
12	9.83 540	14	9.97 269	26	0.02 731	9.86 271	12	48	
13	9.83 554	13	9.97 295	25	0.02 705	9.86 259	12	47	
14	9.83 567	14	9.97 320	25	0.02 680	9.86 247	12	46	**26** **25** **14**
15	9.83 581	13	9.97 345	26	0.02 655	9.86 235	12	45	6 2.6 2.5 1.4
16	9.83 594	14	9.97 371	25	0.02 629	9.86 223	12	44	7 3.0 2.9 1.6
17	9.83 608	13	9.97 396	25	0.02 604	9.86 211	11	43	8 3.5 3.3 1.9
18	9.83 621	13	9.97 421	26	0.02 579	9.86 200	12	42	9 3.9 3.8 2.1
19	9.83 634	14	9.97 447	25	0.02 553	9.86 188	12	41	10 4.3 4.2 2.3
20	9.83 648	13	9.97 472	25	0.02 528	9.86 176	12	40	20 8.7 8.3 4.7
21	9.83 661	13	9.97 497	26	0.02 503	9.86 164	12	39	30 13.0 12.5 7.0
22	9.83 674	14	9.97 523	25	0.02 477	9.86 152	12	38	40 17.3 16.7 9.3
23	9.83 688	13	9.97 548	25	0.02 452	9.86 140	12	37	50 21.7 20.8 11.7
24	9.83 701	14	9.97 573	25	0.02 427	9.86 128	12	36	
25	9.83 715	13	9.97 598	26	0.02 402	9.86 116	12	35	
26	9.83 728	13	9.97 624	25	0.02 376	9.86 104	12	34	
27	9.83 741	14	9.97 649	25	0.02 351	9.86 092	12	33	
28	9.83 755	13	9.97 674	26	0.02 326	9.86 080	12	32	
29	9.83 768	13	9.97 700	25	0.02 300	9.86 068	12	31	
30	9.83 781	14	9.97 725	25	0.02 275	9.86 056	12	30	
31	9.83 795	13	9.97 750	26	0.02 250	9.86 044	12	29	
32	9.83 808	13	9.97 776	25	0.02 224	9.86 032	12	28	
33	9.83 821	13	9.97 801	25	0.02 199	9.86 020	12	27	
34	9.83 834	14	9.97 826	25	0.02 174	9.86 008	12	26	
35	9.83 848	13	9.97 851	26	0.02 149	9.85 996	12	25	
36	9.83 861	13	9.97 877	25	0.02 123	9.85 984	12	24	
37	9.83 874	13	9.97 902	25	0.02 098	9.85 972	12	23	**13** **12** **11**
38	9.83 887	14	9.97 927	26	0.02 073	9.85 960	12	22	6 1.3 1.2 1.1
39	9.83 901	13	9.97 953	25	0.02 047	9.85 948	12	21	7 1.5 1.4 1.3
40	9.83 914	13	9.97 978	25	0.02 022	9.85 936	12	20	8 1.7 1.6 1.5
41	9.83 927	13	9.98 003	26	0.01 997	9.85 924	12	19	9 2.0 1.8 1.6
42	9.83 940	14	9.98 029	25	0.01 971	9.85 912	12	18	10 2.2 2.0 1.8
43	9.83 954	13	9.98 054	25	0.01 946	9.85 900	12	17	20 4.3 4.0 3.7
44	9.83 967	13	9.98 079	25	0.01 921	9.85 888	12	16	30 6.5 6.0 5.5
45	9.83 980	13	9.98 104	26	0.01 896	9.85 876	12	15	40 8.7 8.0 7.3
46	9.83 993	13	9.98 130	25	0.01 870	9.85 864	13	14	50 10.8 10.0 9.2
47	9.84 006	14	9.98 155	25	0.01 845	9.85 851	12	13	
48	9.84 020	13	9.98 180	26	0.01 820	9.85 839	12	12	
49	9.84 033	13	9.98 206	25	0.01 794	9.85 827	12	11	
50	9.84 046	13	9.98 231	25	0.01 769	9.85 815	12	10	
51	9.84 059	13	9.98 256	25	0.01 744	9.85 803	12	9	
52	9.84 072	13	9.98 281	26	0.01 719	9.85 791	12	8	
53	9.84 085	13	9.98 307	25	0.01 693	9.85 779	13	7	
54	9.84 098	14	9.98 332	25	0.01 668	9.85 766	12	6	
55	9.84 112	13	9.98 357	26	0.01 643	9.85 754	12	5	
56	9.84 125	13	9.98 383	25	0.01 617	9.85 742	12	4	
57	9.84 138	13	9.98 408	25	0.01 592	9.85 730	12	3	
58	9.84 151	13	9.98 433	25	0.01 567	9.85 718	12	2	
59	9.84 164	13	9.98 458	26	0.01 542	9.85 706	13	1	
60	9.84 177		9.98 484		0.01 516	9.85 693		0	
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

′	L Sin	d	L Tan	c d	L Cot	L Cos	d		Prop. Pts.
0	9.84 177	13	9.98 484	25	0.01 516	9.85 693	12	60	
1	9.84 190	13	9.98 509	25	0.01 491	9.85 681	12	59	
2	9.84 203	13	9.98 534	26	0.01 466	9.85 669	12	58	
3	9.84 216	13	9.98 560	25	0.01 440	9.85 657	12	57	
4	9.84 229	13	9.98 585	25	0.01 415	9.85 645	13	56	
5	9.84 242	13	9.98 610	25	0.01 390	9.85 632	12	55	
6	9.84 255	14	9.98 635	26	0.01 365	9.85 620	12	54	
7	9.84 269	13	9.98 661	25	0.01 339	9.85 608	12	53	
8	9.84 282	13	9.98 686	25	0.01 314	9.85 596	13	52	
9	9.84 295	13	9.98 711	26	0.01 289	9.85 583	12	51	
10	9.84 308	13	9.98 737	25	0.01 263	9.85 571	12	50	
11	9.84 321	13	9.98 762	25	0.01 238	9.85 559	12	49	
12	9.84 334	13	9.98 787	25	0.01 213	9.85 547	13	48	
13	9.84 347	13	9.98 812	26	0.01 188	9.85 534	12	47	
14	9.84 360	13	9.98 838	25	0.01 162	9.85 522	12	46	
15	9.84 373	12	9.98 863	25	0.01 137	9.85 510	13	45	6 2.6 2.5 1.4
16	9.84 385	13	9.98 888	25	0.01 112	9.85 497	12	44	7 3.0 2.9 1.6
17	9.84 398	13	9.98 913	26	0.01 087	9.85 485	12	43	8 3.5 3.3 1.9
18	9.84 411	13	9.98 939	25	0.01 061	9.85 473	13	42	9 3.9 3.8 2.1
19	9.84 424	13	9.98 964	25	0.01 036	9.85 460	12	41	10 4.3 4.2 2.3
20	9.84 437	13	9.98 989	26	0.01 011	9.85 448	12	40	20 8.7 8.3 4.7
21	9.84 450	13	9.99 015	25	0.00 985	9.85 436	13	39	30 13.0 12.5 7.0
22	9.84 463	13	9.99 040	25	0.00 960	9.85 423	12	38	40 17.3 16.7 9.3
23	9.84 476	13	9.99 065	25	0.00 935	9.85 411	12	37	50 21.7 20.8 11.7
24	9.84 489	13	9.99 090	26	0.00 910	9.85 399	13	36	
25	9.84 502	13	9.99 116	25	0.00 884	9.85 386	12	35	
26	9.84 515	13	9.99 141	25	0.00 859	9.85 374	13	34	
27	9.84 528	12	9.99 166	25	0.00 834	9.85 361	12	33	
28	9.84 540	13	9.99 191	26	0.00 809	9.85 349	12	32	
29	9.84 553	13	9.99 217	25	0.00 783	9.85 337	13	31	
30	9.84 566	13	9.99 242	25	0.00 758	9.85 324	12	30	
31	9.84 579	13	9.99 267	26	0.00 733	9.85 312	13	29	
32	9.84 592	13	9.99 293	25	0.00 707	9.85 299	12	28	
33	9.84 605	13	9.99 318	25	0.00 682	9.85 287	13	27	
34	9.84 618	12	9.99 343	25	0.00 657	9.85 274	12	26	
35	9.84 630	13	9.99 368	26	0.00 632	9.85 262	12	25	
36	9.84 643	13	9.99 394	25	0.00 606	9.85 250	13	24	
37	9.84 656	13	9.99 419	25	0.00 581	9.85 237	12	23	
38	9.84 669	13	9.99 444	25	0.00 556	9.85 225	13	22	13 12
39	9.84 682	12	9.99 469	26	0.00 531	9.85 212	12	21	
40	9.84 694	13	9.99 495	25	0.00 505	9.85 200	13	20	6 1.3 1.2
41	9.84 707	13	9.99 520	25	0.00 480	9.85 187	12	19	7 1.5 1.4
42	9.84 720	13	9.99 545	25	0.00 455	9.85 175	13	18	8 1.7 1.6
43	9.84 733	12	9.99 570	26	0.00 430	9.85 162	12	17	9 2.0 1.8
44	9.84 745	13	9.99 596	25	0.00 404	9.85 150	13	16	10 2.2 2.0
45	9.84 758	13	9.99 621	25	0.00 379	9.85 137	12	15	20 4.3 4.0
46	9.84 771	13	9.99 646	26	0.00 354	9.85 125	13	14	30 6.5 6.0
47	9.84 784	12	9.99 672	25	0.00 328	9.85 112	12	13	40 8.7 8.0
48	9.84 796	13	9.99 697	25	0.00 303	9.85 100	13	12	50 10.8 10.0
49	9.84 809	13	9.99 722	25	0.00 278	9.85 087	13	11	
50	9.84 822	13	9.99 747	26	0.00 253	9.85 074	12	10	
51	9.84 835	12	9.99 773	25	0.00 227	9.85 062	13	9	
52	9.84 847	13	9.99 798	25	0.00 202	9.85 049	12	8	
53	9.84 860	13	9.99 823	25	0.00 177	9.85 037	13	7	
54	9.84 873	12	9.99 848	26	0.00 152	9.85 024	12	6	
55	9.84 885	13	9.99 874	25	0.00 126	9.85 012	13	5	
56	9.84 898	13	9.99 899	25	0.00 101	9.84 999	13	4	
57	9.84 911	12	9.99 924	25	0.00 076	9.84 986	12	3	
58	9.84 923	13	9.99 949	26	0.00 051	9.84 974	13	2	
59	9.84 936	13	9.99 975	25	0.00 025	9.84 961	12	1	
60	9.84 949		0.00 000		0.00 000	9.84 949		0	
	L Cos	d	L Cot	c d	L Tan	L Sin	d	′	Prop. Pts.

TABLE III

NATURAL FUNCTIONS

FOR EACH MINUTE

′	Sin	Tan	Cot	Cos	
0	0.0000	0.0000		1.0000	60
1	0.0003	0.0003	3437.75	1.0000	59
2	0.0006	0.0006	1718.87	1.0000	58
3	0.0009	0.0009	1145.92	1.0000	57
4	0.0012	0.0012	859.436	1.0000	56
5	0.0015	0.0015	687.549	1.0000	55
6	0.0017	0.0017	572.957	1.0000	54
7	0.0020	0.0020	491.106	1.0000	53
8	0.0023	0.0023	429.718	1.0000	52
9	0.0026	0.0026	381.971	1.0000	51
10	0.0029	0.0029	343.774	1.0000	50
11	0.0032	0.0032	312.521	1.0000	49
12	0.0035	0.0035	286.478	1.0000	48
13	0.0038	0.0038	264.441	1.0000	47
14	0.0041	0.0041	245.552	1.0000	46
15	0.0044	0.0044	229.182	1.0000	45
16	0.0047	0.0047	214.858	1.0000	44
17	0.0049	0.0049	202.219	1.0000	43
18	0.0052	0.0052	190.984	1.0000	42
19	0.0055	0.0055	180.932	1.0000	41
20	0.0058	0.0058	171.885	1.0000	40
21	0.0061	0.0061	163.700	1.0000	39
22	0.0064	0.0064	156.259	1.0000	38
23	0.0067	0.0067	149.465	1.0000	37
24	0.0070	0.0070	143.237	1.0000	36
25	0.0073	0.0073	137.507	1.0000	35
26	0.0076	0.0076	132.219	1.0000	34
27	0.0079	0.0079	127.321	1.0000	33
28	0.0081	0.0081	122.774	1.0000	32
29	0.0084	0.0084	118.540	1.0000	31
30	0.0087	0.0087	114.589	1.0000	30
31	0.0090	0.0090	110.892	1.0000	29
32	0.0093	0.0093	107.426	1.0000	28
33	0.0096	0.0096	104.171	1.0000	27
34	0.0099	0.0099	101.107	1.0000	26
35	0.0102	0.0102	98.2179	0.9999	25
36	0.0105	0.0105	95.4895	0.9999	24
37	0.0108	0.0108	92.9085	0.9999	23
38	0.0111	0.0111	90.4633	0.9999	22
39	0.0113	0.0113	88.1436	0.9999	21
40	0.0116	0.0116	85.9398	0.9999	20
41	0.0119	0.0119	83.8435	0.9999	19
42	0.0122	0.0122	81.8470	0.9999	18
43	0.0125	0.0125	79.9434	0.9999	17
44	0.0128	0.0128	78.1263	0.9999	16
45	0.0131	0.0131	76.3900	0.9999	15
46	0.0134	0.0134	74.7292	0.9999	14
47	0.0137	0.0137	73.1390	0.9999	13
48	0.0140	0.0140	71.6151	0.9999	12
49	0.0143	0.0143	70.1533	0.9999	11
50	0.0145	0.0145	68.7501	0.9999	10
51	0.0148	0.0148	67.4019	0.9999	9
52	0.0151	0.0151	66.1055	0.9999	8
53	0.0154	0.0154	64.8580	0.9999	7
54	0.0157	0.0157	63.6567	0.9999	6
55	0.0160	0.0160	62.4992	0.9999	5
56	0.0163	0.0163	61.3829	0.9999	4
57	0.0166	0.0166	60.3058	0.9999	3
58	0.0169	0.0169	59.2659	0.9999	2
59	0.0172	0.0172	58.2612	0.9999	1
60	0.0175	0.0175	57.2900	0.9998	0
	Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos	
0	0.0175	0.0175	57.2900	0.9998	60
1	0.0177	0.0177	56.3506	0.9998	59
2	0.0180	0.0180	55.4415	0.9998	58
3	0.0183	0.0183	54.5613	0.9998	57
4	0.0186	0.0186	53.7086	0.9998	56
5	0.0189	0.0189	52.8821	0.9998	55
6	0.0192	0.0192	52.0807	0.9998	54
7	0.0195	0.0195	51.3032	0.9998	53
8	0.0198	0.0198	50.5485	0.9998	52
9	0.0201	0.0201	49.8157	0.9998	51
10	0.0204	0.0204	49.1039	0.9998	50
11	0.0207	0.0207	48.4121	0.9998	49
12	0.0209	0.0209	47.7395	0.9998	48
13	0.0212	0.0212	47.0853	0.9998	47
14	0.0215	0.0215	46.4489	0.9998	46
15	0.0218	0.0218	45.8294	0.9998	45
16	0.0221	0.0221	45.2261	0.9998	44
17	0.0224	0.0224	44.6386	0.9997	43
18	0.0227	0.0227	44.0661	0.9997	42
19	0.0230	0.0230	43.5081	0.9997	41
20	0.0233	0.0233	42.9641	0.9997	40
21	0.0236	0.0236	42.4335	0.9997	39
22	0.0239	0.0239	41.9158	0.9997	38
23	0.0241	0.0241	41.4106	0.9997	37
24	0.0244	0.0244	40.9174	0.9997	36
25	0.0247	0.0247	40.4358	0.9997	35
26	0.0250	0.0250	39.9655	0.9997	34
27	0.0253	0.0253	39.5059	0.9997	33
28	0.0256	0.0256	39.0568	0.9997	32
29	0.0259	0.0259	38.6177	0.9997	31
30	0.0262	0.0262	38.1885	0.9997	30
31	0.0265	0.0265	37.7686	0.9996	29
32	0.0268	0.0268	37.3579	0.9996	28
33	0.0270	0.0271	36.9560	0.9996	27
34	0.0273	0.0274	36.5627	0.9996	26
35	0.0276	0.0276	36.1776	0.9996	25
36	0.0279	0.0279	35.8006	0.9996	24
37	0.0282	0.0282	35.4313	0.9996	23
38	0.0285	0.0285	35.0695	0.9996	22
39	0.0288	0.0288	34.7151	0.9996	21
40	0.0291	0.0291	34.3678	0.9996	20
41	0.0294	0.0294	34.0273	0.9996	19
42	0.0297	0.0297	33.6935	0.9996	18
43	0.0300	0.0300	33.3662	0.9996	17
44	0.0302	0.0303	33.0452	0.9995	16
45	0.0305	0.0306	32.7303	0.9995	15
46	0.0308	0.0308	32.4213	0.9995	14
47	0.0311	0.0311	32.1181	0.9995	13
48	0.0314	0.0314	31.8205	0.9995	12
49	0.0317	0.0317	31.5284	0.9995	11
50	0.0320	0.0320	31.2416	0.9995	10
51	0.0323	0.0323	30.9599	0.9995	9
52	0.0326	0.0326	30.6833	0.9995	8
53	0.0329	0.0329	30.4116	0.9995	7
54	0.0332	0.0332	30.1446	0.9994	6
55	0.0334	0.0335	29.8823	0.9994	5
56	0.0337	0.0338	29.6245	0.9994	4
57	0.0340	0.0340	29.3711	0.9994	3
58	0.0343	0.0343	29.1220	0.9994	2
59	0.0346	0.0346	28.8771	0.9994	1
60	0.0349	0.0349	28.6363	0.9994	0
	Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos		′	Sin	Tan	Cot	Cos	
0	0.0349	0.0349	28.6363	0.9994	60	0	0 0523	0.0524	19.0811	0.9986	60
1	0.0352	0.0352	28.3994	0.9994	59	1	0.0526	0.0527	18.9755	0.9986	59
2	0.0355	0.0355	28.1664	0.9994	58	2	0.0529	0.0530	18.8711	0.9986	58
3	0.0358	0.0358	27.9372	0.9994	57	3	0.0532	0.0533	18.7678	0.9986	57
4	0.0361	0.0361	27.7117	0.9993	56	4	0.0535	0.0536	18.6656	0.9986	56
5	0.0364	0.0364	27.4899	0.9993	55	5	0.0538	0.0539	18.5645	0.9986	55
6	0.0366	0.0367	27.2715	0.9993	54	6	0.0541	0.0542	18.4645	0.9985	54
7	0.0369	0.0370	27.0566	0.9993	53	7	0.0544	0.0544	18.3655	0.9985	53
8	0.0372	0.0373	26.8450	0.9993	52	8	0.0547	0.0547	18.2677	0.9985	52
9	0.0375	0.0375	26.6367	0.9993	51	9	0.0550	0.0550	18.1708	0.9985	51
10	0.0378	0.0378	26.4316	0.9993	50	10	0.0552	0.0553	18.0750	0.9985	50
11	0.0381	0.0381	26.2296	0.9993	49	11	0.0555	0.0556	17.9802	0.9985	49
12	0.0384	0.0384	26.0307	0.9993	48	12	0.0558	0.0559	17.8863	0.9984	48
13	0.0387	0.0387	25.8348	0.9993	47	13	0.0561	0.0562	17.7934	0.9984	47
14	0.0390	0.0390	25.6418	0.9992	46	14	0.0564	0.0565	17.7015	0.9984	46
15	0.0393	0.0393	25.4517	0.9992	45	15	0.0567	0.0568	17.6106	0.9984	45
16	0.0396	0.0396	25.2644	0.9992	44	16	0.0570	0.0571	17.5205	0.9984	44
17	0.0398	0.0399	25.0798	0.9992	43	17	0.0573	0.0574	17.4314	0.9984	43
18	0.0401	0.0402	24.8978	0.9992	42	18	0.0576	0.0577	17.3432	0.9983	42
19	0.0404	0.0405	24.7185	0.9992	41	19	0.0579	0.0580	17.2558	0.9983	41
20	0.0407	0.0407	24.5418	0.9992	40	20	0.0581	0.0582	17.1693	0.9983	40
21	0.0410	0.0410	24.3675	0.9992	39	21	0.0584	0.0585	17.0837	0.9983	39
22	0.0413	0.0413	24.1957	0.9991	38	22	0.0587	0.0588	16.9990	0.9983	38
23	0.0416	0.0416	24.0263	0.9991	37	23	0.0590	0.0591	16.9150	0.9983	37
24	0.0419	0.0419	23.8593	0.9991	36	24	0.0593	0.0594	16.8319	0.9982	36
25	0.0422	0.0422	23.6945	0.9991	35	25	0.0596	0.0597	16.7496	0.9982	35
26	0.0425	0.0425	23.5321	0.9991	34	26	0.0599	0.0600	16.6681	0.9982	34
27	0.0427	0.0428	23.3718	0.9991	33	27	0.0602	0.0603	16.5874	0.9982	33
28	0.0430	0.0431	23.2137	0.9991	32	28	0.0605	0.0606	16.5075	0.9982	32
29	0.0433	0.0434	23.0577	0.9991	31	29	0.0608	0.0609	16.4283	0.9982	31
30	0.0436	0.0437	22.9038	0.9990	30	30	0.0610	0.0612	16.3499	0.9981	30
31	0.0439	0.0440	22.7519	0.9990	29	31	0.0613	0.0615	16.2722	0.9981	29
32	0.0442	0.0442	22.6020	0.9990	28	32	0.0616	0.0617	16.1952	0.9981	28
33	0.0445	0.0445	22.4541	0.9990	27	33	0.0619	0.0620	16.1190	0.9981	27
34	0.0448	0.0448	22.3081	0.9990	26	34	0.0622	0.0623	16.0435	0.9981	26
35	0.0451	0.0451	22.1640	0.9990	25	35	0.0625	0.0626	15.9687	0.9980	25
36	0.0454	0.0454	22.0217	0.9990	24	36	0.0628	0.0629	15.8945	0.9980	24
37	0.0457	0.0457	21.8813	0.9990	23	37	0.0631	0.0632	15.8211	0.9980	23
38	0.0459	0.0460	21.7426	0.9989	22	38	0.0634	0.0635	15.7483	0.9980	22
39	0.0462	0.0463	21.6056	0.9989	21	39	0.0637	0.0638	15.6762	0.9980	21
40	0.0465	0.0466	21.4704	0.9989	20	40	0.0640	0.0641	15.6048	0.9980	20
41	0.0468	0.0469	21.3369	0.9989	19	41	0.0642	0.0644	15.5340	0.9979	19
42	0.0471	0.0472	21.2049	0.9989	18	42	0.0645	0.0647	15.4638	0.9979	18
43	0.0474	0.0475	21.0747	0.9989	17	43	0.0648	0.0650	15.3943	0.9979	17
44	0.0477	0.0477	20.9460	0.9989	16	44	0.0651	0.0653	15 3254	0.9979	16
45	0.0480	0.0480	20.8188	0.9988	15	45	0.0654	0.0655	15.2571	0.9979	15
46	0.0483	0.0483	20.6932	0.9988	14	46	0.0657	0.0658	15.1893	0.9978	14
47	0.0486	0.0486	20.5691	0.9988	13	47	0.0660	0.0661	15.1222	0.9978	13
48	0.0488	0.0489	20.4465	0.9988	12	48	0.0663	0.0664	15.0557	0.9978	12
49	0.0491	0.0492	20.3253	0.9988	11	49	0.0666	0.0667	14.9898	0.9978	11
50	0.0494	0.0495	20.2056	0.9988	10	50	0.0669	0.0670	14.9244	0.9978	10
51	0.0497	0.0498	20.0872	0.9988	9	51	0.0671	0.0673	14.8596	0.9977	9
52	0.0500	0.0501	19.9702	0.9987	8	52	0.0674	0.0676	14.7954	0.9977	8
53	0.0503	0.0504	19.8546	0.9987	7	53	0.0677	0.0679	14.7317	0.9977	7
54	0.0506	0.0507	19.7403	0.9987	6	54	0.0680	0.0682	14.6685	0.9977	6
55	0.0509	0.0509	19.6273	0.9987	5	55	0.0683	0.0685	14.6059	0.9977	5
56	0.0512	0.0512	19.5156	0.9987	4	56	0.0686	0.0688	14.5438	0.9976	4
57	0.0515	0.0515	19.4051	0.9987	3	57	0.0689	0.0690	14.4823	0.9976	3
58	0.0518	0.0518	19.2959	0.9987	2	58	0.0692	0.0693	14.4212	0.9976	2
59	0.0520	0.0521	19.1879	0.9986	1	59	0.0695	0.0696	14.3607	0.9976	1
60	0.0523	0.0524	19.0811	0.9986	0	60	0.0698	0.0699	14.3007	0.9976	0
	Cos	Cot	Tan	Sin	′		Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos	
0	0.0698	0.0699	14.3007	0.9976	60
1	0.0700	0.0702	14.2411	0.9975	59
2	0.0703	0.0705	14.1821	0.9975	58
3	0.0706	0.0708	14.1235	0.9975	57
4	0.0709	0.0711	14.0655	0.9975	56
5	0.0712	0.0714	14.0079	0.9975	55
6	0.0715	0.0717	13.9507	0.9974	54
7	0.0718	0.0720	13.8940	0.9974	53
8	0.0721	0.0723	13.8378	0.9974	52
9	0.0724	0.0726	13.7821	0.9974	51
10	0.0727	0.0729	13.7267	0.9974	50
11	0.0729	0.0731	13.6719	0.9973	49
12	0.0732	0.0734	13.6174	0.9973	48
13	0.0735	0.0737	13.5634	0.9973	47
14	0.0738	0.0740	13.5098	0.9973	46
15	0.0741	0.0743	13.4566	0.9973	45
16	0.0744	0.0746	13.4039	0.9972	44
17	0.0747	0.0749	13.3515	0.9972	43
18	0.0750	0.0752	13.2996	0.9972	42
19	0.0753	0.0755	13.2480	0.9972	41
20	0.0756	0.0758	13.1969	0.9971	40
21	0.0758	0.0761	13.1461	0.9971	39
22	0.0761	0.0764	13.0958	0.9971	38
23	0.0764	0.0767	13.0458	0.9971	37
24	0.0767	0.0769	12.9962	0.9971	36
25	0.0770	0.0772	12.9469	0.9970	35
26	0.0773	0.0775	12.8981	0.9970	34
27	0.0776	0.0778	12.8496	0.9970	33
28	0.0779	0.0781	12.8014	0.9970	32
29	0.0782	0.0784	12.7536	0.9969	31
30	0.0785	0.0787	12.7062	0.9969	30
31	0.0787	0.0790	12.6591	0.9969	29
32	0.0790	0.0793	12.6124	0.9969	28
33	0.0793	0.0796	12.5660	0.9968	27
34	0.0796	0.0799	12.5199	0.9968	26
35	0.0799	0.0802	12.4742	0.9968	25
36	0.0802	0.0805	12.4288	0.9968	24
37	0.0805	0.0808	12.3838	0.9968	23
38	0.0808	0.0810	12.3390	0.9967	22
39	0.0811	0.0813	12.2946	0.9967	21
40	0.0814	0.0816	12.2505	0.9967	20
41	0.0816	0.0819	12.2067	0.9967	19
42	0.0819	0.0822	12.1632	0.9966	18
43	0.0822	0.0825	12.1201	0.9966	17
44	0.0825	0.0828	12.0772	0.9966	16
45	0.0828	0.0831	12.0346	0.9966	15
46	0.0831	0.0834	11.9923	0.9965	14
47	0.0834	0.0837	11.9504	0.9965	13
48	0.0837	0.0840	11.9087	0.9965	12
49	0.0840	0.0843	11.8673	0.9965	11
50	0.0843	0.0846	11.8262	0.9964	10
51	0.0845	0.0849	11.7853	0.9964	9
52	0.0848	0.0851	11.7448	0.9964	8
53	0.0851	0.0854	11.7045	0.9964	7
54	0.0854	0.0857	11.6645	0.9963	6
55	0.0857	0.0860	11.6248	0.9963	5
56	0.0860	0.0863	11.5853	0.9963	4
57	0.0863	0.0866	11.5461	0.9963	3
58	0.0866	0.0869	11.5072	0.9962	2
59	0.0869	0.0872	11.4685	0.9962	1
60	0.0872	0.0875	11.4301	0.9962	0
	Cos	Cot	Tan	Sin	′

85°

′	Sin	Tan	Cot	Cos	
0	0.0872	0.0875	11.4301	0.9962	60
1	0.0874	0.0878	11.3919	0.9962	59
2	0.0877	0.0881	11.3540	0.9961	58
3	0.0880	0.0884	11.3163	0.9961	57
4	0.0883	0.0887	11.2789	0.9961	56
5	0.0886	0.0890	11.2417	0.9961	55
6	0.0889	0.0892	11.2048	0.9960	54
7	0.0892	0.0895	11.1681	0.9960	53
8	0.0895	0.0898	11.1316	0.9960	52
9	0.0898	0.0901	11.0954	0.9960	51
10	0.0901	0.0904	11.0594	0.9959	50
11	0.0903	0.0907	11.0237	0.9959	49
12	0.0906	0.0910	10.9882	0.9959	48
13	0.0909	0.0913	10.9529	0.9959	47
14	0.0912	0.0916	10.9178	0.9958	46
15	0.0915	0.0919	10.8829	0.9958	45
16	0.0918	0.0922	10.8483	0.9958	44
17	0.0921	0.0925	10.8139	0.9958	43
18	0.0924	0.0928	10.7797	0.9957	42
19	0.0927	0.0931	10.7457	0.9957	41
20	0.0929	0.0934	10.7119	0.9957	40
21	0.0932	0.0936	10.6783	0.9956	39
22	0.0935	0.0939	10.6450	0.9956	38
23	0.0938	0.0942	10.6118	0.9956	37
24	0.0941	0.0945	10.5789	0.9956	36
25	0.0944	0.0948	10.5462	0.9955	35
26	0.0947	0.0951	10.5136	0.9955	34
27	0.0950	0.0954	10.4813	0.9955	33
28	0.0953	0.0957	10.4491	0.9955	32
29	0.0956	0.0960	10.4172	0.9954	31
30	0.0958	0.0963	10.3854	0.9954	30
31	0.0961	0.0966	10.3538	0.9954	29
32	0.0964	0.0969	10.3224	0.9953	28
33	0.0967	0.0972	10.2913	0.9953	27
34	0.0970	0.0975	10.2602	0.9953	26
35	0.0973	0.0978	10.2294	0.9953	25
36	0.0976	0.0981	10.1988	0.9952	24
37	0.0979	0.0983	10.1683	0.9952	23
38	0.0982	0.0986	10.1381	0.9952	22
39	0.0985	0.0989	10.1080	0.9951	21
40	0.0987	0.0992	10.0780	0.9951	20
41	0.0990	0.0995	10.0483	0.9951	19
42	0.0993	0.0998	10.0187	0.9951	18
43	0.0996	0.1001	9.9893	0.9950	17
44	0.0999	0.1004	9.9601	0.9950	16
45	0.1002	0.1007	9.9310	0.9950	15
46	0.1005	0.1010	9.9021	0.9949	14
47	0.1008	0.1013	9.8734	0.9949	13
48	0.1011	0.1016	9.8448	0.9949	12
49	0.1013	0.1019	9.8164	0.9949	11
50	0.1016	0.1022	9.7882	0.9948	10
51	0.1019	0.1025	9.7601	0.9948	9
52	0.1022	0.1028	9 7322	0.9948	8
53	0.1025	0.1030	9.7044	0.9947	7
54	0.1028	0.1033	9.6768	0.9947	6
55	0.1031	0.1036	9.6493	0.9947	5
56	0.1034	0.1039	9.6220	0.9946	4
57	0.1037	0.1042	9.5949	0.9946	3
58	0.1039	0.1045	9.5679	0.9946	2
59	0.1042	0.1048	9.5411	0.9946	1
60	0.1045	0.1051	9.5144	0.9945	0
	Cos	Cot	Tan	Sin	′

84°

′	Sin	Tan	Cot	Cos		′	Sin	Tan	Cot	Cos	
0	0.1045	0.1051	9.5144	0.9945	60	0	0.1219	0.1228	8.1443	0.9925	60
1	0.1048	0.1054	9.4878	0.9945	59	1	0.1222	0.1231	8.1248	0.9925	59
2	0.1051	0.1057	9.4614	0.9945	58	2	0.1224	0.1234	8.1054	0.9925	58
3	0.1054	0.1060	9.4352	0.9944	57	3	0.1227	0.1237	8.0860	0.9924	57
4	0.1057	0.1063	9.4090	0.9944	56	4	0.1230	0.1240	8.0667	0.9924	56
5	0.1060	0.1066	9.3831	0.9944	55	5	0.1233	0.1243	8.0476	0.9924	55
6	0.1063	0.1069	9.3572	0.9943	54	6	0.1236	0.1246	8.0285	0.9923	54
7	0.1066	0.1072	9.3315	0.9943	53	7	0.1239	0.1249	8.0095	0.9923	53
8	0.1068	0.1075	9.3060	0.9943	52	8	0.1242	0.1251	7.9906	0.9923	52
9	0.1071	0.1078	9.2806	0.9942	51	9	0.1245	0.1254	7.9718	0.9922	51
10	0.1074	0.1080	9.2553	0.9942	50	10	0.1248	0.1257	7.9530	0.9922	50
11	0.1077	0.1083	9.2302	0.9942	49	11	0.1250	0.1260	7.9344	0.9922	49
12	0.1080	0.1086	9.2052	0.9942	48	12	0.1253	0.1263	7.9158	0.9921	48
13	0.1083	0.1089	9.1803	0.9941	47	13	0.1256	0.1266	7.8973	0.9921	47
14	0.1086	0.1092	9.1555	0.9941	46	14	0.1259	0.1269	7.8789	0.9920	46
15	0.1089	0.1095	9.1309	0.9941	45	15	0.1262	0.1272	7.8606	0.9920	45
16	0.1092	0.1098	9.1065	0.9940	44	16	0.1265	0.1275	7.8424	0.9920	44
17	0.1094	0.1101	9.0821	0.9940	43	17	0.1268	0.1278	7.8243	0.9919	43
18	0.1097	0.1104	9.0579	0.9940	42	18	0.1271	0.1281	7.8062	0.9919	42
19	0.1100	0.1107	9.0338	0.9939	41	19	0.1274	0.1284	7.7882	0.9919	41
20	0.1103	0.1110	9.0098	0.9939	40	20	0.1276	0.1287	7.7704	0.9918	40
21	0.1106	0.1113	8.9860	0.9939	39	21	0.1279	0.1290	7.7525	0.9918	39
22	0.1109	0.1116	8.9623	0.9938	38	22	0.1282	0.1293	7.7348	0.9917	38
23	0.1112	0.1119	8.9387	0.9938	37	23	0.1285	0.1296	7.7171	0.9917	37
24	0.1115	0.1122	8.9152	0.9938	36	24	0.1288	0.1299	7.6996	0.9917	36
25	0.1118	0.1125	8.8919	0.9937	35	25	0.1291	0.1302	7.6821	0.9916	35
26	0.1120	0.1128	8.8686	0.9937	34	26	0.1294	0.1305	7.6647	0.9916	34
27	0.1123	0.1131	8.8455	0.9937	33	27	0.1297	0.1308	7.6473	0.9916	33
28	0.1126	0.1133	8.8225	0.9936	32	28	0.1299	0.1311	7.6301	0.9915	32
29	0.1129	0.1136	8.7996	0.9936	31	29	0.1302	0.1314	7.6129	0.9915	31
30	0.1132	0.1139	8.7769	0.9936	30	30	0.1305	0.1317	7.5958	0.9914	30
31	0.1135	0.1142	8.7542	0.9935	29	31	0.1308	0.1319	7.5787	0.9914	29
32	0.1138	0.1145	8.7317	0.9935	28	32	0.1311	0.1322	7.5618	0.9914	28
33	0.1141	0.1148	8.7093	0.9935	27	33	0.1314	0.1325	7.5449	0.9913	27
34	0.1144	0.1151	8.6870	0.9934	26	34	0.1317	0.1328	7.5281	0.9913	26
35	0.1146	0.1154	8.6648	0.9934	25	35	0.1320	0.1331	7.5113	0.9913	25
36	0.1149	0.1157	8.6427	0.9934	24	36	0.1323	0.1334	7.4947	0.9912	24
37	0.1152	0.1160	8.6208	0.9933	23	37	0.1325	0.1337	7.4781	0.9912	23
38	0.1155	0.1163	8.5989	0.9933	22	38	0.1328	0.1340	7.4615	0.9911	22
39	0.1158	0.1166	8.5772	0.9933	21	39	0.1331	0.1343	7.4451	0.9911	21
40	0.1161	0.1169	8.5555	0.9932	20	40	0.1334	0.1346	7.4287	0.9911	20
41	0.1164	0.1172	8.5340	0.9932	19	41	0.1337	0.1349	7.4124	0.9910	19
42	0.1167	0.1175	8.5126	0.9932	18	42	0.1340	0.1352	7.3962	0.9910	18
43	0.1170	0.1178	8.4913	0.9931	17	43	0.1343	0.1355	7.3800	0.9909	17
44	0.1172	0.1181	8.4701	0.9931	16	44	0.1346	0.1358	7.3639	0.9909	16
45	0.1175	0.1184	8.4490	0.9931	15	45	0.1349	0.1361	7.3479	0.9909	15
46	0.1178	0.1187	8.4280	0.9930	14	46	0.1351	0.1364	7.3319	0.9908	14
47	0.1181	0.1189	8.4071	0.9930	13	47	0.1354	0.1367	7.3160	0.9908	13
48	0.1184	0.1192	8.3863	0.9930	12	48	0.1357	0.1370	7.3002	0.9907	12
49	0.1187	0.1195	8.3656	0.9929	11	49	0.1360	0.1373	7.2844	0.9907	11
50	0.1190	0.1198	8.3450	0.9929	10	50	0.1363	0.1376	7.2687	0.9907	10
51	0.1193	0.1201	8.3245	0.9929	9	51	0.1366	0.1379	7.2531	0.9906	9
52	0.1196	0.1204	8.3041	0.9928	8	52	0.1369	0.1382	7.2375	0.9906	8
53	0.1198	0.1207	8.2838	0.9928	7	53	0.1372	0.1385	7.2220	0.9905	7
54	0.1201	0.1210	8.2636	0.9928	6	54	0.1374	0.1388	7.2066	0.9905	6
55	0.1204	0.1213	8.2434	0.9927	5	55	0.1377	0.1391	7.1912	0.9905	5
56	0.1207	0.1216	8.2234	0.9927	4	56	0.1380	0.1394	7.1759	0.9904	4
57	0.1210	0.1219	8.2035	0.9927	3	57	0.1383	0.1397	7.1607	0.9904	3
58	0.1213	0.1222	8.1837	0.9926	2	58	0.1386	0.1399	7.1455	0.9903	2
59	0.1216	0.1225	8.1640	0.9926	1	59	0.1389	0.1402	7.1304	0.9903	1
60	0.1219	0.1228	8.1443	0.9925	0	60	0.1392	0.1405	7.1154	0.9903	0
	Cos	Cot	Tan	Sin	′		Cos	Cot	Tan	Sin	′

8°

′	Sin	Tan	Cot	Cos	
0	0.1392	0.1405	7.1154	0.9903	60
1	0.1395	0.1408	7.1004	0.9902	59
2	0.1397	0.1411	7.0855	0.9902	58
3	0.1400	0.1414	7.0706	0.9901	57
4	0.1403	0.1417	7.0558	0.9901	56
5	0.1406	0.1420	7.0410	0.9901	55
6	0.1409	0.1423	7.0264	0.9900	54
7	0.1412	0.1426	7.0117	0.9900	53
8	0.1415	0.1429	6.9972	0.9899	52
9	0.1418	0.1432	6.9827	0.9899	51
10	0.1421	0.1435	6.9682	0.9899	50
11	0.1423	0.1438	6.9538	0.9898	49
12	0.1426	0.1441	6.9395	0.9898	48
13	0.1429	0.1444	6.9252	0.9897	47
14	0.1432	0.1447	6.9110	0.9897	46
15	0.1435	0.1450	6.8969	0.9897	45
16	0.1438	0.1453	6.8828	0.9896	44
17	0.1441	0.1456	6.8687	0.9896	43
18	0.1444	0.1459	6.8548	0.9895	42
19	0.1446	0.1462	6.8408	0.9895	41
20	0.1449	0.1465	6.8269	0.9894	40
21	0.1452	0.1468	6.8131	0.9894	39
22	0.1455	0.1471	6.7994	0.9894	38
23	0.1458	0.1474	6.7856	0.9893	37
24	0.1461	0.1477	6.7720	0.9893	36
25	0.1464	0.1480	6.7584	0.9892	35
26	0.1467	0.1483	6.7448	0.9892	34
27	0.1469	0.1486	6.7313	0.9891	33
28	0.1472	0.1489	6.7179	0.9891	32
29	0.1475	0.1492	6.7045	0.9891	31
30	0.1478	0.1495	6.6912	0.9890	30
31	0.1481	0.1497	6.6779	0.9890	29
32	0.1484	0.1500	6.6646	0.9889	28
33	0.1487	0.1503	6.6514	0.9889	27
34	0.1490	0.1506	6.6383	0.9888	26
35	0.1492	0.1509	6.6252	0.9888	25
36	0.1495	0.1512	6.6122	0.9888	24
37	0.1498	0.1515	6.5992	0.9887	23
38	0.1501	0.1518	6.5863	0.9887	22
39	0.1504	0.1521	6.5734	0.9886	21
40	0.1507	0.1524	6.5606	0.9886	20
41	0.1510	0.1527	6.5478	0.9885	19
42	0.1513	0.1530	6.5350	0.9885	18
43	0.1515	0.1533	6.5223	0.9884	17
44	0.1518	0.1536	6.5097	0.9884	16
45	0.1521	0.1539	6.4971	0.9884	15
46	0.1524	0.1542	6.4846	0.9883	14
47	0.1527	0.1545	6.4721	0.9883	13
48	0.1530	0.1548	6.4596	0.9882	12
49	0.1533	0.1551	6.4472	0.9882	11
50	0.1536	0.1554	6.4348	0.9881	10
51	0.1538	0.1557	6.4225	0.9881	9
52	0.1541	0.1560	6.4103	0.9880	8
53	0.1544	0.1563	6.3980	0.9880	7
54	0.1547	0.1566	6.3859	0.9880	6
55	0.1550	0.1569	6.3737	0.9879	5
56	0.1553	0.1572	6.3617	0.9879	4
57	0.1556	0.1575	6.3496	0.9878	3
58	0.1559	0.1578	6.3376	0.9878	2
59	0.1561	0.1581	6.3257	0.9877	1
60	0.1564	0.1584	6.3138	0.9877	0
	Cos	Cot	Tan	Sin	′

81°

9°

′	Sin	Tan	Cot	Cos	
0	0.1564	0.1584	6.3138	0.9877	60
1	0.1567	0.1587	6.3019	0.9876	59
2	0.1570	0.1590	6.2901	0.9876	58
3	0.1573	0.1593	6.2783	0.9876	57
4	0.1576	0.1596	6.2666	0.9875	56
5	0.1579	0.1599	6.2549	0.9875	55
6	0.1582	0.1602	6.2432	0.9874	54
7	0.1584	0.1605	6.2316	0.9874	53
8	0.1587	0.1608	6.2200	0.9873	52
9	0.1590	0.1611	6.2085	0.9873	51
10	0.1593	0.1614	6.1970	0.9872	50
11	0.1596	0.1617	6.1856	0.9872	49
12	0.1599	0.1620	6.1742	0.9871	48
13	0.1602	0.1623	6.1628	0.9871	47
14	0.1605	0.1626	6.1515	0.9870	46
15	0.1607	0.1629	6.1402	0.9870	45
16	0.1610	0.1632	6.1290	0.9869	44
17	0.1613	0.1635	6.1178	0.9869	43
18	0.1616	0.1638	6.1066	0.9869	42
19	0.1619	0.1641	6.0955	0.9868	41
20	0.1622	0.1644	6.0844	0.9868	40
21	0.1625	0.1647	6.0734	0.9867	39
22	0.1628	0.1650	6.0624	0.9867	38
23	0.1630	0.1653	6.0514	0.9866	37
24	0.1633	0.1655	6.0405	0.9866	36
25	0.1636	0.1658	6.0296	0.9865	35
26	0.1639	0.1661	6.0188	0.9865	34
27	0.1642	0.1664	6.0080	0.9864	33
28	0.1645	0.1667	5.9972	0.9864	32
29	0.1648	0.1670	5.9865	0.9863	31
30	0.1650	0.1673	5.9758	0.9863	30
31	0.1653	0.1676	5.9651	0.9862	29
32	0.1656	0.1679	5.9545	0.9862	28
33	0.1659	0.1682	5.9439	0.9861	27
34	0.1662	0.1685	5.9333	0.9861	26
35	0.1665	0.1688	5.9228	0.9860	25
36	0.1668	0.1691	5.9124	0.9860	24
37	0.1671	0.1694	5.9019	0.9859	23
38	0.1673	0.1697	5.8915	0.9859	22
39	0.1676	0.1700	5.8811	0.9859	21
40	0.1670	0.1703	5.8708	0.9858	20
41	0.1682	0.1706	5.8605	0.9858	19
42	0.1685	0.1709	5.8502	0.9857	18
43	0.1688	0.1712	5.8400	0.9857	17
44	0.1691	0.1715	5.8298	0.9856	16
45	0.1693	0.1718	5.8197	0.9856	15
46	0.1696	0.1721	5.8095	0.9855	14
47	0.1699	0.1724	5.7994	0.9855	13
48	0.1702	0.1727	5.7894	0.9854	12
49	0.1705	0.1730	5.7794	0.9854	11
50	0.1708	0.1733	5.7694	0.9853	10
51	0.1711	0.1736	5.7594	0.9853	9
52	0.1714	0.1739	5.7495	0.9852	8
53	0.1716	0.1742	5.7396	0.9852	7
54	0.1719	0.1745	5.7297	0.9851	6
55	0.1722	0.1748	5.7199	0.9851	5
56	0.1725	0.1751	5.7101	0.9850	4
57	0.1728	0.1754	5.7004	0.9850	3
58	0.1731	0.1757	5.6906	0.9849	2
59	0.1734	0.1760	5.6809	0.9849	1
60	0.1736	0.1763	5.6713	0.9848	0
	Cos	Cot	Tan	Sin	′

80°

′	Sin	Tan	Cot	Cos		′	Sin	Tan	Cot	Cos	
0	0.1736	0.1763	5.6713	0.9848	**60**	**0**	0.1908	0.1944	5.1446	0.9816	**60**
1	0.1739	0.1766	5.6617	0.9848	59	1	0.1911	0.1947	5.1366	0.9816	59
2	0.1742	0.1769	5.6521	0.9847	58	2	0.1914	0.1950	5.1286	0.9815	58
3	0.1745	0.1772	5.6425	0.9847	57	3	0.1917	0.1953	5.1207	0.9815	57
4	0.1748	0.1775	5.6329	0.9846	56	4	0.1920	0.1956	5.1128	0.9814	56
5	0.1751	0.1778	5.6234	0.9846	55	5	0.1922	0.1959	5.1049	0.9813	55
6	0.1754	0.1781	5.6140	0.9845	54	6	0.1925	0.1962	5.0970	0.9813	54
7	0.1757	0.1784	5.6045	0.9845	53	7	0.1928	0.1965	5.0892	0.9812	53
8	0.1759	0.1787	5.5951	0.9844	52	8	0.1931	0.1968	5.0814	0.9812	52
9	0.1762	0.1790	5.5857	0.9843	51	9	0.1934	0.1971	5.0736	0.9811	51
10	0.1765	0.1793	5.5764	0.9843	**50**	**10**	0.1937	0.1974	5.0658	0.9811	**50**
11	0.1768	0.1796	5.5671	0.9842	49	11	0.1939	0.1977	5.0581	0.9810	49
12	0.1771	0.1799	5.5578	0.9842	48	12	0.1942	0.1980	5.0504	0.9810	48
13	0.1774	0.1802	5.5485	0.9841	47	13	0.1945	0.1983	5.0427	0.9809	47
14	0.1777	0.1805	5.5393	0.9841	46	14	0.1948	0.1986	5.0350	0.9808	46
15	0.1779	0.1808	5.5301	0.9840	45	15	0.1951	0.1989	5.0273	0.9808	45
16	0.1782	0.1811	5.5209	0.9840	44	16	0.1954	0.1992	5.0197	0.9807	44
17	0.1785	0.1814	5.5118	0.9839	43	17	0.1957	0.1995	5.0121	0.9807	43
18	0.1788	0.1817	5.5026	0.9839	42	18	0.1959	0.1998	5.0045	0.9806	42
19	0.1791	0.1820	5.4936	0.9838	41	19	0.1962	0.2001	4.9969	0.9806	41
20	0.1794	0.1823	5.4845	0.9838	**40**	**20**	0.1965	0.2004	4.9894	0.9805	**40**
21	0.1797	0.1826	5.4755	0.9837	39	21	0.1968	0.2007	4.9819	0.9804	39
22	0.1799	0.1829	5.4665	0.9837	38	22	0.1971	0.2010	4.9744	0.9804	38
23	0.1802	0.1832	5.4575	0.9836	37	23	0.1974	0.2013	4.9669	0.9803	37
24	0.1805	0.1835	5.4486	0.9836	36	24	0.1977	0.2016	4.9594	0.9803	36
25	0.1808	0.1838	5.4397	0.9835	35	25	0.1979	0.2019	4.9520	0.9802	35
26	0.1811	0.1841	5.4308	0.9835	34	26	0.1982	0.2022	4.9446	0.9802	34
27	0.1814	0.1844	5.4219	0.9834	33	27	0.1985	0.2025	4.9372	0.9801	33
28	0.1817	0.1847	5.4131	0.9834	32	28	0.1988	0.2028	4.9298	0.9800	32
29	0.1819	0.1850	5.4043	0.9833	31	29	0.1991	0.2031	4.9225	0.9800	31
30	0.1822	0.1853	5.3955	0.9833	**30**	**30**	0.1994	0.2035	4.9152	0.9799	**30**
31	0.1825	0.1856	5.3868	0.9832	29	31	0.1997	0.2038	4.9078	0.9799	29
32	0.1828	0.1859	5.3781	0.9831	28	32	0.1999	0.2041	4.9006	0.9798	28
33	0.1831	0.1862	5.3694	0.9831	27	33	0.2002	0.2044	4.8933	0.9798	27
34	0.1834	0.1865	5.3607	0.9830	26	34	0.2005	0.2047	4.8860	0.9797	26
35	0.1837	0.1868	5.3521	0.9830	25	35	0.2008	0.2050	4.8788	0.9796	25
36	0.1840	0.1871	5.3435	0.9829	24	36	0.2011	0.2053	4.8716	0.9796	24
37	0.1842	0.1874	5.3349	0.9829	23	37	0.2014	0.2056	4.8644	0.9795	23
38	0.1845	0.1877	5.3263	0.9828	22	38	0.2016	0.2059	4.8573	0.9795	22
39	0.1848	0.1880	5.3178	0.9828	21	39	0.2019	0.2062	4.8501	0.9794	21
40	0.1851	0.1883	5.3093	0.9827	**20**	**40**	0.2022	0.2065	4.8430	0.9793	**20**
41	0.1854	0.1887	5.3008	0.9827	19	41	0.2025	0.2068	4.8359	0.9793	19
42	0.1857	0.1890	5.2924	0.9826	18	42	0.2028	0.2071	4.8288	0.9792	18
43	0.1860	0.1893	5.2839	0.9826	17	43	0.2031	0.2074	4.8218	0.9792	17
44	0.1862	0.1896	5.2755	0.9825	16	44	0.2034	0.2077	4.8147	0.9791	16
45	0.1865	0.1899	5.2672	0.9825	15	45	0.2036	0.2080	4.8077	0.9790	15
46	0.1868	0.1902	5.2588	0.9824	14	46	0.2039	0.2083	4.8007	0.9790	14
47	0.1871	0.1905	5.2505	0.9823	13	47	0.2042	0.2086	4.7937	0.9789	13
48	0.1874	0.1908	5.2422	0.9823	12	48	0.2045	0.2089	4.7867	0.9789	12
49	0.1877	0.1911	5.2339	0.9822	11	49	0.2048	0.2092	4.7798	0.9788	11
50	0.1880	0.1914	5.2257	0.9822	**10**	**50**	0.2051	0.2095	4.7729	0.9787	**10**
51	0.1882	0.1917	5.2174	0.9821	9	51	0.2054	0.2098	4.7659	0.9787	9
52	0.1885	0.1920	5.2092	0.9821	8	52	0.2056	0.2101	4.7591	0.9786	8
53	0.1888	0.1923	5.2011	0.9820	7	53	0.2059	0.2104	4.7522	0.9786	7
54	0.1891	0.1926	5.1929	0.9820	6	54	0.2062	0.2107	4.7453	0.9785	6
55	0.1894	0.1929	5.1848	0.9819	5	55	0.2065	0.2110	4.7385	0.9784	5
56	0.1897	0.1932	5.1767	0.9818	4	56	0.2068	0.2113	4.7317	0.9784	4
57	0.1900	0.1935	5.1686	0.9818	3	57	0.2071	0.2116	4.7249	0.9783	3
58	0.1902	0.1938	5.1606	0.9817	2	58	0.2073	0.2119	4.7181	0.9783	2
59	0.1905	0.1941	5.1526	0.9817	1	59	0.2076	0.2123	4.7114	0.9782	1
60	0.1908	0.1944	5.1446	0.9816	**0**	**60**	0.2079	0.2126	4.7046	0.9781	**0**
	Cos	**Cot**	**Tan**	**Sin**	**′**		**Cos**	**Cot**	**Tan**	**Sin**	**′**

′	Sin	Tan	Cot	Cos	
0	0.2079	0.2126	4.7046	0.9781	60
1	0.2082	0.2129	4.6979	0.9781	59
2	0.2085	0.2132	4.6912	0.9780	58
3	0.2088	0.2135	4.6845	0.9780	57
4	0.2090	0.2138	4.6779	0.9779	56
5	0.2093	0.2141	4.6712	0.9778	55
6	0.2096	0.2144	4.6646	0.9778	54
7	0.2099	0.2147	4.6580	0.9777	53
8	0.2102	0.2150	4.6514	0.9777	52
9	0.2105	0.2153	4.6448	0.9776	51
10	0.2108	0.2156	4.6382	0.9775	50
11	0.2110	0.2159	4.6317	0.9775	49
12	0.2113	0.2162	4.6252	0.9774	48
13	0.2116	0.2165	4.6187	0.9774	47
14	0.2119	0.2168	4.6122	0.9773	46
15	0.2122	0.2171	4.6057	0.9772	45
16	0.2125	0.2174	4.5993	0.9772	44
17	0.2127	0.2177	4.5928	0.9771	43
18	0.2130	0.2180	4.5864	0.9770	42
19	0.2133	0.2183	4.5800	0.9770	41
20	0.2136	0.2186	4.5736	0.9769	40
21	0.2139	0.2189	4.5673	0.9769	39
22	0.2142	0.2193	4.5609	0.9768	38
23	0.2145	0.2196	4.5546	0.9767	37
24	0.2147	0.2199	4.5483	0.9767	36
25	0.2150	0.2202	4.5420	0.9766	35
26	0.2153	0.2205	4.5357	0.9765	34
27	0.2156	0.2208	4.5294	0.9765	33
28	0.2159	0.2211	4.5232	0.9764	32
29	0.2162	0.2214	4.5169	0.9764	31
30	0.2164	0.2217	4.5107	0.9763	30
31	0.2167	0.2220	4.5045	0.9762	29
32	0.2170	0.2223	4.4983	0.9762	28
33	0.2173	0.2226	4.4922	0.9761	27
34	0.2176	0.2229	4.4860	0.9760	26
35	0.2179	0.2232	4.4799	0.9760	25
36	0.2181	0.2235	4.4737	0.9759	24
37	0.2184	0.2238	4.4676	0.9759	23
38	0.2187	0.2241	4.4615	0.9758	22
39	0.2190	0.2244	4.4555	0.9757	21
40	0.2193	0.2247	4.4494	0.9757	20
41	0.2196	0.2251	4.4434	0.9756	19
42	0.2198	0.2254	4.4373	0.9755	18
43	0.2201	0.2257	4.4313	0.9755	17
44	0.2204	0.2260	4.4253	0.9754	16
45	0.2207	0.2263	4.4194	0.9753	15
46	0.2210	0.2266	4.4134	0.9753	14
47	0.2213	0.2269	4.4075	0.9752	13
48	0.2215	0.2272	4.4015	0.9751	12
49	0.2218	0.2275	4.3956	0.9751	11
50	0.2221	0.2278	4.3897	0.9750	10
51	0.2224	0.2281	4.3838	0.9750	9
52	0.2227	0.2284	4.3779	0.9749	8
53	0.2230	0.2287	4.3721	0.9748	7
54	0.2233	0.2290	4.3662	0.9748	6
55	0.2235	0.2293	4.3604	0.9747	5
56	0.2238	0.2296	4.3546	0.9746	4
57	0.2241	0.2299	4.3488	0.9746	3
58	0.2244	0.2303	4.3430	0.9745	2
59	0.2247	0.2306	4.3372	0.9744	1
60	0.2250	0.2309	4.3315	0.9744	0
	Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos	
0	0.2250	0.2309	4.3315	0.9744	60
1	0.2252	0.2312	4.3257	0.9743	59
2	0.2255	0.2315	4.3200	0.9742	58
3	0.2258	0.2318	4.3143	0.9742	57
4	0.2261	0.2321	4.3086	0.9741	56
5	0.2264	0.2324	4.3029	0.9740	55
6	0.2267	0.2327	4.2972	0.9740	54
7	0.2269	0.2330	4.2916	0.9739	53
8	0.2272	0.2333	4.2859	0.9738	52
9	0.2275	0.2336	4.2803	0.9738	51
10	0.2278	0.2339	4.2747	0.9737	50
11	0.2281	0.2342	4.2691	0.9736	49
12	0.2284	0.2345	4.2635	0.9736	48
13	0.2286	0.2349	4.2580	0.9735	47
14	0.2289	0.2352	4.2524	0.9734	46
15	0.2292	0.2355	4.2468	0.9734	45
16	0.2295	0.2358	4.2413	0.9733	44
17	0.2298	0.2361	4.2358	0.9732	43
18	0.2300	0.2364	4.2303	0.9732	42
19	0.2303	0.2367	4.2248	0.9731	41
20	0.2306	0.2370	4.2193	0.9730	40
21	0.2309	0.2373	4.2139	0.9730	39
22	0.2312	0.2376	4.2084	0.9729	38
23	0.2315	0.2379	4.2030	0.9728	37
24	0.2317	0.2382	4.1976	0.9728	36
25	0.2320	0.2385	4.1922	0.9727	35
26	0.2323	0.2388	4.1868	0.9726	34
27	0.2326	0.2392	4.1814	0.9726	33
28	0.2329	0.2395	4.1760	0.9725	32
29	0.2332	0.2398	4.1706	0.9724	31
30	0.2334	0.2401	4.1653	0.9724	30
31	0.2337	0.2404	4.1600	0.9723	29
32	0.2340	0.2407	4.1547	0.9722	28
33	0.2343	0.2410	4.1493	0.9722	27
34	0.2346	0.2413	4.1441	0.9721	26
35	0.2349	0.2416	4.1388	0.9720	25
36	0.2351	0.2419	4.1335	0.9720	24
37	0.2354	0.2422	4.1282	0.9719	23
38	0.2357	0.2425	4.1230	0.9718	22
39	0.2360	0.2428	4.1178	0.9718	21
40	0.2363	0.2432	4.1126	0.9717	20
41	0.2366	0.2435	4.1074	0.9716	19
42	0.2368	0.2438	4.1022	0.9715	18
43	0.2371	0.2441	4.0970	0.9715	17
44	0.2374	0.2444	4.0918	0.9714	16
45	0.2377	0.2447	4.0867	0.9713	15
46	0.2380	0.2450	4.0815	0.9713	14
47	0.2383	0.2453	4.0764	0.9712	13
48	0.2385	0.2456	4.0713	0.9711	12
49	0.2388	0.2459	4.0662	0.9711	11
50	0.2391	0.2462	4.0611	0.9710	10
51	0.2394	0.2465	4.0560	0.9709	9
52	0.2397	0.2469	4.0509	0.9709	8
53	0.2399	0.2472	4.0459	0.9708	7
54	0.2402	0.2475	4.0408	0.9707	6
55	0.2405	0.2478	4.0358	0.9706	5
56	0.2408	0.2481	4.0308	0.9706	4
57	0.2411	0.2484	4.0257	0.9705	3
58	0.2414	0.2487	4.0207	0.9704	2
59	0.2416	0.2490	4.0158	0.9704	1
60	0.2419	0.2493	4.0108	0.9703	0
	Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos		′	Sin	Tan	Cot	Cos	
0	0.2419	0.2493	4.0108	0.9703	60	0	0.2588	0.2679	3.7321	0.9659	60
1	0.2422	0.2496	4.0058	0.9702	59	1	0.2591	0.2683	3.7277	0.9659	59
2	0.2425	0.2499	4.0009	0.9702	58	2	0.2594	0.2686	3.7234	0.9658	58
3	0.2428	0.2503	3.9959	0.9701	57	3	0.2597	0.2689	3.7191	0.9657	57
4	0.2431	0.2506	3.9910	0.9700	56	4	0.2599	0.2692	3.7148	0.9656	56
5	0.2433	0.2509	3.9861	0.9699	55	5	0.2602	0.2695	3.7105	0.9655	55
6	0.2436	0.2512	3.9812	0.9699	54	6	0.2605	0.2698	3.7062	0.9655	54
7	0.2439	0.2515	3.9763	0.9698	53	7	0.2608	0.2701	3.7019	0.9654	53
8	0.2442	0.2518	3.9714	0.9697	52	8	0.2611	0.2704	3.6976	0.9653	52
9	0.2445	0.2521	3.9665	0.9697	51	9	0.2613	0.2708	3.6933	0.9652	51
10	0.2447	0.2524	3.9617	0.9696	50	10	0.2616	0.2711	3.6891	0.9652	50
11	0.2450	0.2527	3.9568	0.9695	49	11	0.2619	0.2714	3.6848	0.9651	49
12	0.2453	0.2530	3.9520	0.9694	48	12	0.2622	0.2717	3.6806	0.9650	48
13	0.2456	0.2533	3.9471	0.9694	47	13	0.2625	0.2720	3.6764	0.9649	47
14	0.2459	0.2537	3.9423	0.9693	46	14	0.2628	0.2723	3.6722	0.9649	46
15	0.2462	0.2540	3.9375	0.9692	45	15	0.2630	0.2726	3.6680	0.9648	45
16	0.2464	0.2543	3.9327	0.9692	44	16	0.2633	0.2729	3.6638	0.9647	44
17	0.2467	0.2546	3.9279	0.9691	43	17	0.2636	0.2733	3.6596	0.9646	43
18	0.2470	0.2549	3.9232	0.9690	42	18	0.2639	0.2736	3.6554	0.9646	42
19	0.2473	0.2552	3.9184	0.9689	41	19	0.2642	0.2739	3.6512	0.9645	41
20	0.2476	0.2555	3.9136	0.9689	40	20	0.2644	0.2742	3.6470	0.9644	40
21	0.2478	0.2558	3.9089	0.9688	39	21	0.2647	0.2745	3.6429	0.9643	39
22	0.2481	0.2561	3.9042	0.9687	38	22	0.2650	0.2748	3.6387	0.9642	38
23	0.2484	0.2564	3.8995	0.9687	37	23	0.2653	0.2751	3.6346	0.9642	37
24	0.2487	0.2568	3.8947	0.9686	36	24	0.2656	0.2754	3.6305	0.9641	36
25	0.2490	0.2571	3.8900	0.9685	35	25	0.2658	0.2758	3.6264	0.9640	35
26	0.2493	0.2574	3.8854	0.9684	34	26	0.2661	0.2761	3.6222	0.9639	34
27	0.2495	0.2577	3.8807	0.9684	33	27	0.2664	0.2764	3.6181	0.9639	33
28	0.2498	0.2580	3.8760	0.9683	32	28	0.2667	0.2767	3.6140	0.9638	32
29	0.2501	0.2583	3.8714	0.9682	31	29	0.2670	0.2770	3.6100	0.9637	31
30	0.2504	0.2586	3.8667	0.9681	30	30	0.2672	0.2773	3.6059	0.9636	30
31	0.2507	0.2589	3.8621	0.9681	29	31	0.2675	0.2776	3.6018	0.9636	29
32	0.2509	0.2592	3.8575	0.9680	28	32	0.2678	0.2780	3.5978	0.9635	28
33	0.2512	0.2595	3.8528	0.9679	27	33	0.2681	0.2783	3.5937	0.9634	27
34	0.2515	0.2599	3.8482	0.9679	26	34	0.2684	0.2786	3.5897	0.9633	26
35	0.2518	0.2602	3.8436	0.9678	25	35	0.2686	0.2789	3.5856	0.9632	25
36	0.2521	0.2605	3.8391	0.9677	24	36	0.2689	0.2792	3.5816	0.9632	24
37	0.2524	0.2608	3.8345	0.9676	23	37	0.2692	0.2795	3.5776	0.9631	23
38	0.2526	0.2611	3.8299	0.9676	22	38	0.2695	0.2798	3.5736	0.9630	22
39	0.2529	0.2614	3.8254	0.9675	21	39	0.2698	0.2801	3.5696	0.9629	21
40	0.2532	0.2617	3.8208	0.9674	20	40	0.2700	0.2805	3.5656	0.9628	20
41	0.2535	0.2620	3.8163	0.9673	19	41	0.2703	0.2808	3.5616	0.9628	19
42	0.2538	0.2623	3.8118	0.9673	18	42	0.2706	0.2811	3.5576	0.9627	18
43	0.2540	0.2627	3.8073	0.9672	17	43	0.2709	0.2814	3.5536	0.9626	17
44	0.2543	0.2630	3.8028	0.9671	16	44	0.2712	0.2817	3.5497	0.9625	16
45	0.2546	0.2633	3.7983	0.9670	15	45	0.2714	0.2820	3.5457	0.9625	15
46	0.2549	0.2636	3.7938	0.9670	14	46	0.2717	0.2823	3.5418	0.9624	14
47	0.2552	0.2639	3.7893	0.9669	13	47	0.2720	0.2827	3.5379	0.9623	13
48	0.2554	0.2642	3.7848	0.9668	12	48	0.2723	0.2830	3.5339	0.9622	12
49	0.2557	0.2645	3.7804	0.9667	11	49	0.2726	0.2833	3.5300	0.9621	11
50	0.2560	0.2648	3.7760	0.9667	10	50	0.2728	0.2836	3.5261	0.9621	10
51	0.2563	0.2651	3.7715	0.9666	9	51	0.2731	0.2839	3.5222	0.9620	9
52	0.2566	0.2655	3.7671	0.9665	8	52	0.2734	0.2842	3.5183	0.9619	8
53	0.2569	0.2658	3.7627	0.9665	7	53	0.2737	0.2845	3.5144	0.9618	7
54	0.2571	0.2661	3.7583	0.9664	6	54	0.2740	0.2849	3.5105	0.9617	6
55	0.2574	0.2664	3.7539	0.9663	5	55	0.2742	0.2852	3.5067	0.9617	5
56	0.2577	0.2667	3.7495	0.9662	4	56	0.2745	0.2855	3.5028	0.9616	4
57	0.2580	0.2670	3.7451	0.9662	3	57	0.2748	0.2858	3.4989	0.9615	3
58	0.2583	0.2673	3.7408	0.9661	2	58	0.2751	0.2861	3.4951	0.9614	2
59	0.2585	0.2676	3.7364	0.9660	1	59	0.2754	0.2864	3.4912	0.9613	1
60	0.2588	0.2679	3.7321	0.9659	0	60	0.2756	0.2867	3.4874	0.9613	0
	Cos	Cot	Tan	Sin	′		Cos	Cot	Tan	Sin	′

,	Sin	Tan	Cot	Cos	
0	0.2756	0.2867	3.4874	0.9613	60
1	0.2759	0.2871	3.4836	0.9612	59
2	0.2762	0.2874	3.4798	0.9611	58
3	0.2765	0.2877	3.4760	0.9610	57
4	0.2768	0.2880	3.4722	0.9609	56
5	0.2770	0.2883	3.4684	0.9609	55
6	0.2773	0.2886	3.4646	0.9608	54
7	0.2776	0.2890	3.4608	0.9607	53
8	0.2779	0.2893	3.4570	0.9606	52
9	0.2782	0.2896	3.4533	0.9605	51
10	0.2784	0.2899	3.4495	0.9605	50
11	0.2787	0.2902	3.4458	0.9604	49
12	0.2790	0.2905	3.4420	0.9603	48
13	0.2793	0.2908	3.4383	0.9602	47
14	0.2795	0.2912	3.4346	0.9601	46
15	0.2798	0.2915	3.4308	0.9600	45
16	0.2801	0.2918	3.4271	0.9600	44
17	0.2804	0.2921	3.4234	0.9599	43
18	0.2807	0.2924	3.4197	0.9598	42
19	0.2809	0.2927	3.4160	0.9597	41
20	0.2812	0.2931	3.4124	0.9596	40
21	0.2815	0.2934	3.4087	0.9596	39
22	0.2818	0.2937	3.4050	0.9595	38
23	0.2821	0.2940	3.4014	0.9594	37
24	0.2823	0.2943	3.3977	0.9593	36
25	0.2826	0.2946	3.3941	0.9592	35
26	0.2829	0.2949	3.3904	0.9591	34
27	0.2832	0.2953	3.3868	0.9591	33
28	0.2835	0.2956	3.3832	0.9590	32
29	0.2837	0.2959	3.3796	0.9589	31
30	0.2840	0.2962	3.3759	0.9588	30
31	0.2843	0.2965	3.3723	0.9587	29
32	0.2846	0.2968	3.3687	0.9587	28
33	0.2849	0.2972	3.3652	0.9586	27
34	0.2851	0.2975	3.3616	0.9585	26
35	0.2854	0.2978	3.3580	0.9584	25
36	0.2857	0.2981	3.3544	0.9583	24
37	0.2860	0.2984	3.3509	0.9582	23
38	0.2862	0.2987	3.3473	0.9582	22
39	0.2865	0.2991	3.3438	0.9581	21
40	0.2868	0.2994	3.3402	0.9580	20
41	0.2871	0.2997	3.3367	0.9579	19
42	0.2874	0.3000	3.3332	0.9578	18
43	0.2876	0.3003	3.3297	0.9577	17
44	0.2879	0.3006	3.3261	0 9577	16
45	0.2882	0.3010	3.3226	0.9576	15
46	0.2885	0.3013	3.3191	0.9575	14
47	0.2888	0.3016	3.3156	0.9574	13
48	0.2890	0.3019	3.3122	0.9573	12
49	0.2893	0.3022	3.3087	0.9572	11
50	0.2896	0.3026	3.3052	0.9572	10
51	0.2899	0.3029	3.3017	0.9571	9
52	0.2901	0.3032	3.2983	0.9570	8
53	0.2904	0.3035	3.2948	0.9569	7
54	0.2907	0.3038	3.2914	0.9568	6
55	0.2910	0.3041	3.2879	0.9567	5
56	0.2913	0.3045	3.2845	0.9566	4
57	0.2915	0.3048	3.2811	0.9566	3
58	0.2918	0.3051	3.2777	0.9565	2
59	0.2921	0.3054	3.2743	0.9564	1
60	0.2924	0.3057	3.2709	0.9563	0
	Cos	Cot	Tan	Sin	,

,	Sin	Tan	Cot	Cos	
0	0.2924	0.3057	3.2709	0.9563	60
1	0.2926	0.3060	3.2675	0.9562	59
2	0.2929	0.3064	3.2641	0.9561	58
3	0.2932	0.3067	3.2607	0.9560	57
4	0.2935	0.3070	3.2573	0.9560	56
5	0.2938	0.3073	3.2539	0.9558	55
6	0.2940	0.3076	3.2506	0.9558	54
7	0.2943	0.3080	3.2472	0.9557	53
8	0.2946	0.3083	3.2438	0.9556	52
9	0.2949	0.3086	3.2405	0.9555	51
10	0.2952	0.3089	3.2371	0.9555	50
11	0.2954	0.3092	3.2338	0.9554	49
12	0.2957	0.3096	3.2305	0.9553	48
13	0.2960	0.3099	3.2272	0.9552	47
14	0.2963	0.3102	3.2238	0.9551	46
15	0.2965	0.3105	3.2205	0.9550	45
16	0.2968	0.3108	3.2172	0.9549	44
17	0.2971	0.3111	3.2139	0.9548	43
18	0.2974	0.3115	3.2106	0.9548	42
19	0.2977	0.3118	3.2073	0.9547	41
20	0.2979	0.3121	3.2041	0.9546	40
21	0.2982	0.3124	3.2008	0.9545	39
22	0.2985	0.3127	3.1975	0.9544	38
23	0.2988	0.3131	3.1943	0.9543	37
24	0.2990	0.3134	3.1910	0.9542	36
25	0.2993	0.3137	3.1878	0.9542	35
26	0.2996	0.3140	3.1845	0.9541	34
27	0.2999	0.3143	3.1813	0.9540	33
28	0.3002	0.3147	3.1780	0.9539	32
29	0.3004	0.3150	3.1748	0.9538	31
30	0.3007	0.3153	3.1716	0.9537	30
31	0.3010	0.3156	3.1684	0.9536	29
32	0.3013	0.3159	3.1652	0.9535	28
33	0.3015	0.3163	3.1620	0.9535	27
34	0.3018	0.3166	3.1588	0.9534	26
35	0.3021	0.3169	3.1556	0.9533	25
36	0.3024	0.3172	3.1524	0.9532	24
37	0.3026	0.3175	3.1492	0.9531	23
38	0.3029	0.3179	3.1460	0.9530	22
39	0.3032	0.3182	3.1429	0.9529	21
40	0.3035	0.3185	3.1397	0.9528	20
41	0.3038	0.3188	3.1366	0.9527	19
42	0.3040	0.3191	3.1334	0.9527	18
43	0.3043	0.3195	3.1303	0.9526	17
44	0.3046	0.3198	3.1271	0.9525	16
45	0.3049	0.3201	3.1240	0.9524	15
46	0.3051	0.3204	3.1209	0.9523	14
47	0.3054	0.3207	3.1178	0.9522	13
48	0.3057	0.3211	3.1146	0.9521	12
49	0.3060	0.3214	3.1115	0.9520	11
50	0.3062	0.3217	3.1084	0.9520	10
51	0.3065	0.3220	3.1053	0.9519	9
52	0.3068	0.3223	3.1022	0.9518	8
53	0.3071	0.3227	3.0991	0.9517	7
54	0.3074	0.3230	3.0961	0.9516	6
55	0.3076	0.3233	3.0930	0.9515	5
56	0.3079	0.3236	3.0899	0.9514	4
57	0.3082	0.3240	3.0868	0.9513	3
58	0.3085	0.3243	3.0838	0.9512	2
59	0.3087	0.3246	3.0807	0.9511	1
60	0.3090	0.3249	3.0777	0.9511	0
	Cos	Cot	Tan	Sin	,

′	Sin	Tan	Cot	Cos				Sin	Tan	Cot	Cos	
0	0.3090	0.3249	3.0777	0.9511	**60**		**0**	0.3256	0.3443	2.9042	0.9455	**60**
1	0.3093	0.3252	3.0746	0.9510	59		1	0.3258	0.3447	2.9015	0.9454	59
2	0.3096	0.3256	3.0716	0.9509	58		2	0.3261	0.3450	2.8987	0.9453	58
3	0.3098	0.3259	3.0686	0.9508	57		3	0.3264	0.3453	2.8960	0.9452	57
4	0.3101	0.3262	3.0655	0.9507	56		4	0.3267	0.3456	2.8933	0.9451	56
5	0.3104	0.3265	3.0625	0.9506	55		5	0.3269	0.3460	2.8905	0.9450	55
6	0.3107	0.3269	3.0595	0.9505	54		6	0.3272	0.3463	2.8878	0.9449	54
7	0.3110	0.3272	3.0565	0.9504	53		7	0.3275	0.3466	2.8851	0.9449	53
8	0.3112	0.3275	3.0535	0.9503	52		8	0.3278	0.3469	2.8824	0.9448	52
9	0.3115	0.3278	3.0505	0.9502	51		9	0.3280	0.3473	2.8797	0.9447	51
10	0.3118	0.3281	3.0475	0.9502	**50**		**10**	0.3283	0.3476	2.8770	0.9446	**50**
11	0.3121	0.3285	3.0445	0.9501	49		11	0.3286	0.3479	2.8743	0.9445	49
12	0.3123	0.3288	3.0415	0.9500	48		12	0.3289	0.3482	2.8716	0.9444	48
13	0.3126	0.3291	3.0385	0.9499	47		13	0.3291	0.3486	2.8689	0.9443	47
14	0.3129	0.3294	3.0356	0.9498	46		14	0.3294	0.3489	2.8662	0.9442	46
15	0.3132	0.3298	3.0326	0.9497	45		15	0.3297	0.3492	2.8636	0.9441	45
16	0.3134	0.3301	3.0296	0.9496	44		16	0.3300	0.3495	2.8609	0.9440	44
17	0.3137	0.3304	3.0267	0.9495	43		17	0.3302	0.3499	2.8582	0.9439	43
18	0.3140	0.3307	3.0237	0.9494	42		18	0.3305	0.3502	2.8556	0.9438	42
19	0.3143	0.3310	3.0208	0.9493	41		19	0.3308	0.3505	2.8529	0.9437	41
20	0.3145	0.3314	3.0178	0.9492	**40**		**20**	0.3311	0.3508	2.8502	0.9436	**40**
21	0.3148	0.3317	3.0149	0.9492	39		21	0.3313	0.3512	2.8476	0.9435	39
22	0.3151	0.3320	3.0120	0.9491	38		22	0.3316	0.3515	2.8449	0.9434	38
23	0.3154	0.3323	3.0090	0.9490	37		23	0.3319	0.3518	2.8423	0.9433	37
24	0.3156	0.3327	3.0061	0.9489	36		24	0.3322	0.3522	2.8397	0.9432	36
25	0.3159	0.3330	3.0032	0.9488	35		25	0.3324	0.3525	2.8370	0.9431	35
26	0.3162	0.3333	3.0003	0.9487	34		26	0.3327	0.3528	2.8344	0.9430	34
27	0.3165	0.3336	2.9974	0.9486	33		27	0.3330	0.3531	2.8318	0.9429	33
28	0.3168	0.3339	2.9945	0.9485	32		28	0.3333	0.3535	2.8291	0.9428	32
29	0.3170	0.3343	2.9916	0.9484	31		29	0.3335	0.3538	2.8265	0.9427	31
30	0.3173	0.3346	2.9887	0.9483	**30**		**30**	0.3338	0.3541	2.8239	0.9426	**30**
31	0.3176	0.3349	2.9858	0.9482	29		31	0.3341	0.3544	2.8213	0.9425	29
32	0.3179	0.3352	2.9829	0.9481	28		32	0.3344	0.3548	2.8187	0.9424	28
33	0.3181	0.3356	2.9800	0.9480	27		33	0.3346	0.3551	2.8161	0.9423	27
34	0.3184	0.3359	2.9772	0.9480	26		34	0.3349	0.3554	2.8135	0.9423	26
35	0.3187	0.3362	2.9743	0.9479	25		35	0.3352	0.3558	2.8109	0.9422	25
36	0.3190	0.3365	2.9714	0.9478	24		36	0.3355	0.3561	2.8083	0.9421	24
37	0.3192	0.3369	2.9686	0.9477	23		37	0.3357	0.3564	2.8057	0.9420	23
38	0.3195	0.3372	2.9657	0.9476	22		38	0.3360	0.3567	2.8032	0.9419	22
39	0.3198	0.3375	2.9629	0.9475	21		39	0.3363	0.3571	2.8006	0.9418	21
40	0.3201	0.3378	2.9600	0.9474	**20**		**40**	0.3365	0.3574	2.7980	0.9417	**20**
41	0.3203	0.3382	2.9572	0.9473	19		41	0.3368	0.3577	2.7955	0.9416	19
42	0.3206	0.3385	2.9544	0.9472	18		42	0.3371	0.3581	2.7929	0.9415	18
43	0.3209	0.3388	2.9515	0.9471	17		43	0.3374	0.3584	2.7903	0.9414	17
44	0.3212	0.3391	2.9487	0.9470	16		44	0.3376	0.3587	2.7878	0.9413	16
45	0.3214	0.3395	2.9459	0.9469	15		45	0.3379	0.3590	2.7852	0.9412	15
46	0.3217	0.3398	2.9431	0.9468	14		46	0.3382	0.3594	2.7827	0.9411	14
47	0.3220	0.3401	2.9403	0.9467	13		47	0.3385	0.3597	2.7801	0.9410	13
48	0.3223	0.3404	2.9375	0.9466	12		48	0.3387	0.3600	2.7776	0.9409	12
49	0.3225	0.3408	2.9347	0.9466	11		49	0.3390	0.3604	2.7751	0.9408	11
50	0.3228	0.3411	2.9319	0.9465	**10**		**50**	0.3393	0.3607	2.7725	0.9407	**10**
51	0.3231	0.3414	2.9291	0.9464	9		51	0.3396	0.3610	2.7700	0.9406	9
52	0.3234	0.3417	2.9263	0.9463	8		52	0.3398	0.3613	2.7675	0.9405	8
53	0.3236	0.3421	2.9235	0.9462	7		53	0.3401	0.3617	2.7650	0.9404	7
54	0.3239	0.3424	2.9208	0.9461	6		54	0.3404	0.3620	2.7625	0.9403	6
55	0.3242	0.3427	2.9180	0.9460	5		55	0.3407	0.3623	2.7600	0.9402	5
56	0.3245	0.3430	2.9152	0.9459	4		56	0.3409	0.3627	2.7575	0.9401	4
57	0.3247	0.3434	2.9125	0.9458	3		57	0.3412	0.3630	2.7550	0.9400	3
58	0.3250	0.3437	2.9097	0.9457	2		58	0.3415	0.3633	2.7525	0.9399	2
59	0.3253	0.3440	2.9070	0.9456	1		59	0.3417	0.3636	2.7500	0.9398	1
60	0.3256	0.3443	2.9042	0.9455	**0**		**60**	0.3420	0.3640	2.7475	0.9397	**0**
	Cos	Cot	Tan	Sin	′			Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos		′	Sin	Tan	Cot	Cos	
0	0.3420	0.3640	2.7475	0.9397	60	0	0.3584	0.3839	2.6051	0.9336	60
1	0.3423	0.3643	2.7450	0.9396	59	1	0.3586	0.3842	2.6028	0.9335	59
2	0.3426	0.3646	2.7425	0.9395	58	2	0.3589	0.3845	2.6006	0.9334	58
3	0.3428	0.3650	2.7400	0.9394	57	3	0.3592	0.3849	2.5983	0.9333	57
4	0.3431	0.3653	2.7376	0.9393	56	4	0.3595	0.3852	2.5961	0.9332	56
5	0.3434	0.3656	2.7351	0.9392	55	5	0.3597	0.3855	2.5938	0.9331	55
6	0.3437	0.3659	2.7326	0.9391	54	6	0.3600	0.3859	2.5916	0.9330	54
7	0.3439	0.3663	2.7302	0.9390	53	7	0.3603	0.3862	2.5893	0.9328	53
8	0.3442	0.3666	2.7277	0.9389	52	8	0.3605	0.3865	2.5871	0.9327	52
9	0.3445	0.3669	2.7253	0.9388	51	9	0.3608	0.3869	2.5848	0.9326	51
10	0.3448	0.3673	2.7228	0.9387	50	10	0.3611	0.3872	2.5826	0.9325	50
11	0.3450	0.3676	2.7204	0.9386	49	11	0.3614	0.3875	2.5804	0.9324	49
12	0.3453	0.3679	2.7179	0.9385	48	12	0.3616	0.3879	2.5782	0.9323	48
13	0.3456	0.3683	2.7155	0.9384	47	13	0.3619	0.3882	2.5759	0.9322	47
14	0.3458	0.3686	2.7130	0.9383	46	14	0.3622	0.3885	2.5737	0.9321	46
15	0.3461	0.3689	2.7106	0.9382	45	15	0.3624	0.3889	2.5715	0.9320	45
16	0.3464	0.3693	2.7082	0.9381	44	16	0.3627	0.3892	2.5693	0.9319	44
17	0.3467	0.3696	2.7058	0.9380	43	17	0.3630	0.3895	2.5671	0.9318	43
18	0.3469	0.3699	2.7034	0.9379	42	18	0.3633	0.3899	2.5649	0.9317	42
19	0.3472	0.3702	2.7009	0.9378	41	19	0.3635	0.3902	2.5627	0.9316	41
20	0.3475	0.3706	2.6985	0.9377	40	20	0.3638	0.3906	2.5605	0.9315	40
21	0.3478	0.3709	2.6961	0.9376	39	21	0.3641	0.3909	2.5583	0.9314	39
22	0.3480	0.3712	2.6937	0.9375	38	22	0.3643	0.3912	2.5561	0.9313	38
23	0.3483	0.3716	2.6913	0.9374	37	23	0.3646	0.3916	2.5539	0.9312	37
24	0.3486	0.3719	2.6889	0.9373	36	24	0.3649	0.3919	2.5517	0.9311	36
25	0.3488	0.3722	2.6865	0.9372	35	25	0.3651	0.3922	2.5495	0.9309	35
26	0.3491	0.3726	2.6841	0.9371	34	26	0.3654	0.3926	2.5473	0.9308	34
27	0.3494	0.3729	2.6818	0.9370	33	27	0.3657	0.3929	2.5452	0.9307	33
28	0.3497	0.3732	2.6794	0.9369	32	28	0.3660	0.3932	2.5430	0.9306	32
29	0.3499	0.3736	2.6770	0.9368	31	29	0.3662	0.3936	2.5408	0.9305	31
30	0.3502	0.3739	2.6746	0.9367	30	30	0.3665	0.3939	2.5386	0.9304	30
31	0.3505	0.3742	2.6723	0.9366	29	31	0.3668	0.3942	2.5365	0.9303	29
32	0.3508	0.3745	2.6699	0.9365	28	32	0.3670	0.3946	2.5343	0.9302	28
33	0.3510	0.3749	2.6675	0.9364	27	33	0.3673	0.3949	2.5322	0.9301	27
34	0.3513	0.3752	2.6652	0.9363	26	34	0.3676	0.3953	2.5300	0.9300	26
35	0.3516	0.3755	2.6628	0.9362	25	35	0.3679	0.3956	2.5279	0.9299	25
36	0.3518	0.3759	2.6605	0.9361	24	36	0.3681	0.3959	2.5257	0.9298	24
37	0.3521	0.3762	2.6581	0.9360	23	37	0.3684	0.3963	2.5236	0.9297	23
38	0.3524	0.3765	2.6558	0.9359	22	38	0.3687	0.3966	2.5214	0.9296	22
39	0.3527	0.3769	2.6534	0.9358	21	39	0.3689	0.3969	2.5193	0.9295	21
40	0.3529	0.3772	2.6511	0.9356	20	40	0.3692	0.3973	2.5172	0.9293	20
41	0.3532	0.3775	2.6488	0.9355	19	41	0.3695	0.3976	2.5150	0.9292	19
42	0.3535	0.3779	2.6464	0.9354	18	42	0.3697	0.3979	2.5129	0.9291	18
43	0.3537	0.3782	2.6441	0.9353	17	43	0.3700	0.3983	2.5108	0.9290	17
44	0.3540	0.3785	2.6418	0.9352	16	44	0.3703	0.3986	2.5086	0.9289	16
45	0.3543	0.3789	2.6395	0.9351	15	45	0.3706	0.3990	2.5065	0.9288	15
46	0.3546	0.3792	2.6371	0.9350	14	46	0.3708	0.3993	2.5044	0.9287	14
47	0.3548	0.3795	2.6348	0.9349	13	47	0.3711	0.3996	2.5023	0.9286	13
48	0.3551	0.3799	2.6325	0.9348	12	48	0.3714	0.4000	2.5002	0.9285	12
49	0.3554	0.3802	2.6302	0.9347	11	49	0.3716	0.4003	2.4981	0.9284	11
50	0.3557	0.3805	2.6279	0.9346	10	50	0.3719	0.4006	2.4960	0.9283	10
51	0.3559	0.3809	2.6256	0.9345	9	51	0.3722	0.4010	2.4939	0.9282	9
52	0.3562	0.3812	2.6233	0.9344	8	52	0.3724	0.4013	2.4918	0.9281	8
53	0.3565	0.3815	2.6210	0.9343	7	53	0.3727	0.4017	2.4897	0.9279	7
54	0.3567	0.3819	2.6187	0.9342	6	54	0.3730	0.4020	2.4876	0.9278	6
55	0.3570	0.3822	2.6165	0.9341	5	55	0.3733	0.4023	2.4855	0.9277	5
56	0.3573	0.3825	2.6142	0.9340	4	56	0.3735	0.4027	2.4834	0.9276	4
57	0.3576	0.3829	2.6119	0.9339	3	57	0.3738	0.4030	2.4813	0.9275	3
58	0.3578	0.3832	2.6096	0.9338	2	58	0.3741	0.4033	2.4792	0.9274	2
59	0.3581	0.3835	2.6074	0.9337	1	59	0.3743	0.4037	2.4772	0.9273	1
60	0.3584	0.3839	2.6051	0.9336	0	60	0.3746	0.4040	2.4751	0.9272	0
	Cos	Cot	Tan	Sin	′		Cos	Cot	Tau	Sin	′

′	Sin	Tan	Cot	Cos		′	Sin	Tan	Cot	Cos	
0	0.3746	0.4040	2.4751	0.9272	60	0	0.3907	0.4245	2.3559	0.9205	60
1	0.3749	0.4044	2.4730	0.9271	59	1	0.3910	0.4248	2.3539	0.9204	59
2	0.3751	0.4047	2.4709	0.9270	58	2	0.3913	0.4252	2.3520	0.9203	58
3	0.3754	0.4050	2.4689	0.9269	57	3	0.3915	0.4255	2.3501	0.9202	57
4	0.3757	0.4054	2.4668	0.9267	56	4	0.3918	0.4258	2.3483	0.9200	56
5	0.3760	0.4057	2.4648	0.9266	55	5	0.3921	0.4262	2.3464	0.9199	55
6	0.3762	0.4061	2.4627	0.9265	54	6	0.3923	0.4265	2.3445	0.9198	54
7	0.3765	0.4064	2.4606	0.9264	53	7	0.3926	0.4269	2.3426	0.9197	53
8	0.3768	0.4067	2.4586	0.9263	52	8	0.3929	0.4272	2.3407	0.9196	52
9	0.3770	0.4071	2.4566	0.9262	51	9	0.3931	0.4276	2.3388	0.9195	51
10	0.3773	0.4074	2.4545	0.9261	50	10	0.3934	0.4279	2.3369	0.9194	50
11	0.3776	0.4078	2.4525	0.9260	49	11	0.3937	0.4283	2.3351	0.9192	49
12	0.3778	0.4081	2.4504	0.9259	48	12	0.3939	0.4286	2.3332	0.9191	48
13	0.3781	0.4084	2.4484	0.9258	47	13	0.3942	0.4289	2.3313	0.9190	47
14	0.3784	0.4088	2.4464	0.9257	46	14	0.3945	0.4293	2.3294	0.9189	46
15	0.3786	0.4091	2.4443	0.9255	45	15	0.3947	0.4296	2.3276	0.9188	45
16	0.3789	0.4095	2.4423	0.9254	44	16	0.3950	0.4300	2.3257	0.9187	44
17	0.3792	0.4098	2.4403	0.9253	43	17	0.3953	0.4303	2.3238	0.9186	43
18	0.3795	0.4101	2.4383	0.9252	42	18	0.3955	0.4307	2.3220	0.9184	42
19	0.3797	0.4105	2.4362	0.9251	41	19	0.3958	0.4310	2.3201	0.9183	41
20	0.3800	0.4108	2.4342	0.9250	40	20	0.3961	0.4314	2.3183	0.9182	40
21	0.3803	0.4111	2.4322	0.9249	39	21	0.3963	0.4317	2.3164	0.9181	39
22	0.3805	0.4115	2.4302	0.9248	38	22	0.3966	0.4320	2.3146	0.9180	38
23	0.3808	0.4118	2.4282	0.9247	37	23	0.3969	0.4324	2.3127	0.9179	37
24	0.3811	0.4122	2.4262	0.9245	36	24	0.3971	0.4327	2.3109	0.9178	36
25	0.3813	0.4125	2.4242	0.9244	35	25	0.3974	0.4331	2.3090	0.9176	35
26	0.3816	0.4129	2.4222	0.9243	34	26	0.3977	0.4334	2.3072	0.9175	34
27	0.3819	0.4132	2.4202	0.9242	33	27	0.3979	0.4338	2.3053	0.9174	33
28	0.3821	0.4135	2.4182	0.9241	32	28	0.3982	0.4341	2.3035	0.9173	32
29	0.3824	0.4139	2.4162	0.9240	31	29	0.3985	0.4345	2.3017	0.9172	31
30	0.3827	0.4142	2.4142	0.9239	30	30	0.3987	0.4348	2.2998	0.9171	30
31	0.3830	0.4146	2.4122	0.9238	29	31	0.3990	0.4352	2.2980	0.9169	29
32	0.3832	0.4149	2.4102	0.9237	28	32	0.3993	0.4355	2.2962	0.9168	28
33	0.3835	0.4152	2.4083	0.9235	27	33	0.3995	0.4359	2.2944	0.9167	27
34	0.3838	0.4156	2.4063	0.9234	26	34	0.3998	0.4362	2.2925	0.9166	26
35	0.3840	0.4159	2.4043	0.9233	25	35	0.4001	0.4365	2.2907	0.9165	25
36	0.3843	0.4163	2.4023	0.9232	24	36	0.4003	0.4369	2.2889	0.9164	24
37	0.3846	0.4166	2.4004	0.9231	23	37	0.4006	0.4372	2 2871	0.9162	23
38	0.3848	0.4169	2.3984	0.9230	22	38	0.4009	0.4376	2.2853	0.9161	22
39	0.3851	0.4173	2.3964	0.9229	21	39	0.4011	0.4379	2.2835	0.9160	21
40	0.3854	0.4176	2.3945	0.9228	20	40	0.4014	0.4383	2.2817	0.9159	20
41	0.3856	0.4180	2.3925	0.9227	19	41	0.4017	0.4386	2.2799	0.9158	19
42	0.3859	0.4183	2.3906	0.9225	18	42	0.4019	0.4390	2.2781	0.9157	18
43	0.3862	0.4187	2.3886	0.9224	17	43	0.4022	0.4393	2.2763	0.9155	17
44	0.3864	0.4190	2.3867	0.9223	16	44	0.4025	0.4397	2.2745	0.9154	16
45	0.3867	0.4193	2.3847	0.9222	15	45	0.4027	0.4400	2.2727	0.9153	15
46	0.3870	0.4197	2.3828	0.9221	14	46	0.4030	0.4404	2.2709	0.9152	14
47	0.3872	0.4200	2.3808	0.9220	13	47	0.4033	0.4407	2.2691	0.9151	13
48	0.3875	0.4204	2.3789	0.9219	12	48	0.4035	0.4411	2.2673	0.9150	12
49	0.3878	0.4207	2.3770	0.9218	11	49	0.4038	0.4414	2.2655	0.9148	11
50	0.3881	0.4210	2.3750	0.9216	10	50	0.4041	0.4417	2.2637	0.9147	10
51	0.3883	0.4214	2.3731	0.9215	9	51	0.4043	0.4421	2.2620	0.9145	9
52	0.3886	0.4217	2.3712	0.9214	8	52	0.4046	0.4424	2.2602	0.9145	8
53	0.3889	0.4221	2.3693	0.9213	7	53	0.4049	0.4428	2.2584	0.9144	7
54	0.3891	0.4224	2.3673	0.9212	6	54	0.4051	0.4431	2.2566	0.9143	6
55	0.3894	0.4228	2.3654	0.9211	5	55	0.4054	0.4435	2.2549	0.9141	5
56	0.3897	0.4231	2.3635	0.9210	4	56	0.4057	0.4438	2.2531	0.9140	4
57	0.3899	0.4234	2.3616	0.9208	3	57	0.4059	0.4442	2.2513	0.9139	3
58	0.3902	0.4238	2.3597	0.9207	2	58	0.4062	0.4445	2.2496	0.9138	2
59	0.3905	0.4241	2.3578	0.9206	1	59	0.4065	0.4449	2.2478	0.9137	1
60	0.3907	0.4245	2.3559	0.9205	0	60	0.4067	0.4452	2.2460	0.9135	0
	Cos	Cot	Tan	Sin	′		Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos	
0	0.4067	0.4452	2.2460	0.9135	60
1	0.4070	0.4456	2.2443	0.9134	59
2	0.4073	0.4459	2.2425	0.9133	58
3	0.4075	0.4463	2.2408	0.9132	57
4	0.4078	0.4466	2.2390	0.9131	56
5	0.4081	0.4470	2.2373	0.9130	55
6	0.4083	0.4473	2.2355	0.9128	54
7	0.4086	0.4477	2.2338	0.9127	53
8	0.4089	0.4480	2.2320	0.9126	52
9	0.4091	0.4484	2.2303	0.9125	51
10	0.4094	0.4487	2.2286	0.9124	50
11	0.4097	0.4491	2.2268	0.9122	49
12	0.4099	0.4494	2.2251	0.9121	48
13	0.4102	0.4498	2.2234	0.9120	47
14	0.4105	0.4501	2.2216	0.9119	46
15	0.4107	0.4505	2.2199	0.9118	45
16	0.4110	0.4508	2.2182	0.9116	44
17	0.4112	0.4512	2.2165	0.9115	43
18	0.4115	0.4515	2.2148	0.9114	42
19	0.4118	0.4519	2.2130	0.9113	41
20	0.4120	0.4522	2.2113	0.9112	40
21	0.4123	0.4526	2.2096	0.9110	39
22	0.4126	0.4529	2.2079	0.9109	38
23	0.4128	0.4533	2.2062	0.9108	37
24	0.4131	0.4536	2.2045	0.9107	36
25	0.4134	0.4540	2.2028	0.9106	35
26	0.4136	0.4543	2.2011	0.9104	34
27	0.4139	0.4547	2.1994	0.9103	33
28	0.4142	0.4550	2.1977	0.9102	32
29	0.4144	0.4554	2.1960	0.9101	31
30	0.4147	0.4557	2.1943	0.9100	30
31	0.4150	0.4561	2.1926	0.9098	29
32	0.4152	0.4564	2.1909	0.9097	28
33	0.4155	0.4568	2.1892	0.9096	27
34	0.4158	0.4571	2.1876	0.9095	26
35	0.4160	0.4575	2.1859	0.9094	25
36	0.4163	0.4578	2.1842	0.9092	24
37	0.4165	0.4582	2.1825	0.9091	23
38	0.4168	0.4585	2.1808	0.9090	22
39	0.4171	0.4589	2.1792	0.9089	21
40	0.4173	0.4592	2.1775	0.9088	20
41	0.4176	0.4596	2.1758	0.9086	19
42	0.4179	0.4599	2.1742	0.9085	18
43	0.4181	0.4003	2.1725	0.9084	17
44	0.4184	0.4607	2.1708	0.9083	16
45	0.4187	0.4610	2.1692	0.9081	15
46	0.4189	0.4614	2.1675	0.9080	14
47	0.4192	0.4617	2.1659	0.9079	13
48	0.4195	0.4621	2.1642	0.9078	12
49	0.4197	0.4624	2.1625	0.9077	11
50	0.4200	0.4628	2.1609	0.9075	10
51	0.4202	0.4631	2.1592	0.9074	9
52	0.4205	0.4635	2.1576	0.9073	8
53	0.4208	0.4638	2.1560	0.9072	7
54	0.4210	0.4642	2.1543	0.9070	6
55	0.4213	0.4645	2.1527	0.9069	5
56	0.4216	0.4649	2.1510	0.9068	4
57	0.4218	0.4652	2.1494	0.9067	3
58	0.4221	0.4656	2.1478	0.9066	2
59	0.4224	0.4660	2.1461	0.9064	1
60	0.4226	0.4663	2.1445	0.9063	0
	Cos	Cot	Tan	Sin	′

65°

′	Sin	Tan	Cot	Cos	
0	0.4226	0.4663	2.1445	0.9063	60
1	0.4229	0.4667	2.1429	0.9062	59
2	0.4231	0.4670	2.1413	0.9061	58
3	0.4234	0.4674	2.1396	0.9059	57
4	0.4237	0.4677	2.1380	0.9058	56
5	0.4239	0.4681	2.1364	0.9057	55
6	0.4242	0.4684	2.1348	0.9056	54
7	0.4245	0.4688	2.1332	0.9054	53
8	0.4247	0.4691	2.1315	0.9053	52
9	0.4250	0.4695	2.1299	0.9052	51
10	0.4253	0.4699	2.1283	0.9051	50
11	0.4255	0.4702	2.1267	0.9050	49
12	0.4258	0.4706	2.1251	0.9048	48
13	0.4260	0.4709	2.1235	0.9047	47
14	0.4263	0.4713	2.1219	0.9046	46
15	0.4266	0.4716	2.1203	0.9045	45
16	0.4268	0.4720	2.1187	0.9043	44
17	0.4271	0.4723	2.1171	0.9042	43
18	0.4274	0.4727	2.1155	0.9041	42
19	0.4276	0.4731	2.1139	0.9040	41
20	0.4279	0.4734	2.1123	0.9038	40
21	0.4281	0.4738	2.1107	0.9037	39
22	0.4284	0.4741	2.1092	0.9036	38
23	0.4287	0.4745	2.1076	0.9035	37
24	0.4289	0.4748	2.1060	0.9033	36
25	0.4292	0.4752	2.1044	0.9032	35
26	0.4295	0.4755	2.1028	0.9031	34
27	0.4297	0.4759	2.1013	0.9030	33
28	0.4300	0.4763	2.0997	0.9028	32
29	0.4302	0.4766	2.0981	0.9027	31
30	0.4305	0.4770	2.0965	0.9026	30
31	0.4308	0.4773	2.0950	0.9025	29
32	0.4310	0.4777	2.0934	0.9023	28
33	0.4313	0.4780	2.0918	0.9022	27
34	0.4316	0.4784	2.0903	0.9021	26
35	0.4318	0.4788	2.0887	0.9020	25
36	0.4321	0.4791	2.0872	0.9018	24
37	0.4323	0.4795	2.0859	0.9017	23
38	0.4326	0.4798	2.0840	0.9016	22
39	0.4329	0.4802	2.0825	0.9015	21
40	0.4331	0.4806	2.0809	0.9013	20
41	0.4334	0.4809	2.0794	0.9012	19
42	0.4337	0.4813	2.0778	0.9011	18
43	0.4339	0.4816	2.0763	0.9010	17
44	0.4342	0.4820	2.0748	0.9008	16
45	0.4344	0.4823	2.0732	0.9007	15
46	0.4347	0.4827	2.0717	0.9006	14
47	0.4350	0.4831	2.0701	0.9004	13
48	0.4352	0.4834	2.0686	0.9003	12
49	0.4355	0.4838	2.0671	0.9002	11
50	0.4358	0.4841	2.0655	0.9001	10
51	0.4360	0.4845	2.0640	0.8999	9
52	0.4363	0.4849	2.0625	0.8998	8
53	0.4365	0.4852	2.0609	0.8997	7
54	0.4368	0.4856	2.0594	0.8996	6
55	0.4371	0.4859	2.0579	0.8994	5
56	0.4373	0.4863	2.0564	0.8993	4
57	0.4376	0.4867	2.0549	0.8992	3
58	0.4378	0.4870	2.0533	0.8990	2
59	0.4381	0.4874	2.0518	0.8989	1
60	0.4384	0.4877	2.0503	0.8988	0
	Cos	Cot	Tan	Sin	′

64°

′	Sin	Tan	Cot	Cos		′	Sin	Tan	Cot	Cos	
0	0.4384	0.4877	2.0503	0.8988	60	0	0.4540	0.5095	1.9626	0.8910	60
1	0.4386	0.4881	2.0488	0.8987	59	1	0.4542	0.5099	1.9612	0.8909	59
2	0.4389	0.4885	2.0473	0.8985	58	2	0.4545	0.5103	1.9598	0.8907	58
3	0 4392	0.4888	2.0458	0.8984	57	3	0.4548	0.5106	1.9584	0.8906	57
4	0.4394	0.4892	2.0443	0.8983	56	4	0.4550	0.5110	1.9570	0.8905	56
5	0.4397	0.4895	2.0428	0.8982	55	5	0.4553	0.5114	1.9556	0.8903	55
6	0.4399	0.4899	2.0413	0.8980	54	6	0.4555	0.5117	1.9542	0.8902	54
7	0.4402	0.4903	2.0398	0.8979	53	7	0.4558	0.5121	1.9528	0.8901	53
8	0.4405	0.4906	2.0383	0.8978	52	8	0.4561	0.5125	1.9514	0.8899	52
9	0.4407	0.4910	2.0368	0.8976	51	9	0.4563	0.5128	1.9500	0.8898	51
10	0.4410	0.4913	2.0353	0.8975	50	10	0.4566	0.5132	1.9486	0.8897	50
11	0.4412	0.4917	2.0338	0.8974	49	11	0.4568	0.5136	1.9472	0.8895	49
12	0.4415	0.4921	2.0323	0.8973	48	12	0.4571	0.5139	1.9458	0.8894	48
13	0.4418	0.4924	2.0308	0.8971	47	13	0.4574	0.5143	1.9444	0.8893	47
14	0.4420	0.4928	2.0293	0.8970	46	14	0.4576	0.5147	1.9430	0.8892	46
15	0.4423	0.4931	2.0278	0.8969	45	15	0.4579	0.5150	1.9416	0.8890	45
16	0.4425	0.4935	2.0263	0.8967	44	16	0.4581	0.5154	1.9402	0.8889	44
17	0.4428	0.4939	2.0248	0.8966	43	17	0.4584	0.5158	1.9388	0.8888	43
18	0.4431	0.4942	2.0233	0.8965	42	18	0.4586	0.5161	1.9375	0.8886	42
19	0.4433	0.4946	2.0219	0.8964	41	19	0.4589	0.5165	1.9361	0.8885	41
20	0.4436	0.4950	2.0204	0.8962	40	20	0.4592	0.5169	1.9347	0.8884	40
21	0.4439	0.4953	2.0189	0 8961	39	21	0.4594	0.5172	1.9333	0.8882	39
22	0.4441	0.4957	2.0174	0.8960	38	22	0.4597	0.5176	1.9319	0.8881	38
23	0.4444	0.4960	2.0160	0.8958	37	23	0.4599	0.5180	1.9306	0.8879	37
24	0.4446	0.4964	2.0145	0.8957	36	24	0.4602	0.5184	1.9292	0.8878	36
25	0.4449	0.4968	2.0130	0.8956	35	25	0.4605	0.5187	1.9278	0.8877	35
26	0.4452	0.4971	2.0115	0.8955	34	26	0.4607	0.5191	1.9265	0.8875	34
27	0.4454	0.4975	2.0101	0.8953	33	27	0.4610	0.5195	1.9251	0.8874	33
28	0.4457	0.4979	2.0086	0.8952	32	28	0.4612	0.5198	1.9237	0.8873	32
29	0.4459	0.4982	2.0072	0.8951	31	29	0.4615	0.5202	1.9223	0.8871	31
30	0.4462	0.4986	2.0057	0.8949	30	30	0.4617	0.5206	1.9210	0.8870	30
31	0.4465	0.4989	2.0042	0.8948	29	31	0.4620	0.5209	1.9196	0.8869	29
32	0.4467	0.4993	2.0028	0.8947	28	32	0.4623	0.5213	1.9183	0.8867	28
33	0.4470	0.4997	2.0013	0.8945	27	33	0.4625	0.5217	1.9169	0.8866	27
34	0.4472	0.5000	1.9999	0.8944	26	34	0.4628	0.5220	1.9155	0.8865	26
35	0.4475	0.5004	1.9984	0.8943	25	35	0.4630	0.5224	1.9142	0.8863	25
36	0.4478	0.5008	1.9970	0.8942	24	36	0.4633	0.5228	1.9128	0.8862	24
37	0.4480	0.5011	1.9955	0.8940	23	37	0.4636	0.5232	1.9115	0.8861	23
38	0.4483	0.5015	1.9941	0.8939	22	38	0.4638	0.5235	1.9101	0.8859	22
39	0.4485	0.5019	1.9926	0.8938	21	39	0.4641	0.5239	1.9088	0.8858	21
40	0.4488	0.5022	1.9912	0.8936	20	40	0.4643	0.5243	1.9074	0.8857	20
41	0.4491	0.5026	1.9897	0.8935	19	41	0.4646	0.5246	1.9061	0.8855	19
42	0.4493	0.5029	1.9883	0.8934	18	42	0.4648	0.5250	1.9047	0.8854	18
43	0.4496	0.5033	1.9868	0.8932	17	43	0.4651	0.5254	1.9034	0.8853	17
44	0.4498	0.5037	1.9854	0.8931	16	44	0.4654	0.5258	1.9020	0.8851	16
45	0.4501	0.5040	1.9840	0.8930	15	45	0.4656	0.5261	1.9007	0.8850	15
46	0.4504	0.5044	1.9825	0.8928	14	46	0.4659	0.5265	1.8993	0.8849	14
47	0.4506	0.5048	1.9811	0.8927	13	47	0.4661	0.5269	1.8980	0.8847	13
48	0.4509	0.5051	1.9797	0.8926	12	48	0.4664	0.5272	1.8967	0.8846	12
49	0.4511	0.5055	1.9782	0.8925	11	49	0.4666	0.5276	1.8953	0.8844	11
50	0.4514	0.5059	1.9768	0 8923	10	50	0.4669	0.5280	1.8940	0.8843	10
51	0.4517	0.5062	1.9754	0.8922	9	51	0.4672	0.5284	1.8927	0.8842	9
52	0.4519	0.5066	1.9740	0.8921	8	52	0.4674	0.5287	1.8913	0.8840	8
53	0.4522	0.5070	1.9725	0.8919	7	53	0.4677	0.5291	1.8900	0.8839	7
54	0.4524	0.5073	1.9711	0.8918	6	54	0.4679	0.5295	1.8887	0.8838	6
55	0.4527	0.5077	1.9697	0.8917	5	55	0.4682	0.5298	1.8873	0.8836	5
56	0.4530	0.5081	1.9683	0.8915	4	56	0.4684	0.5302	1.8860	0.8835	4
57	0.4532	0.5084	1.9669	0.8914	3	57	0.4687	0.5306	1.8847	0.8834	3
58	0.4535	0.5088	1.9654	0.8913	2	58	0.4690	0.5310	1.8834	0.8832	2
59	0.4537	0.5092	1.9640	0.8911	1	59	0.4692	0.5313	1.8820	0.8831	1
60	0.4540	0.5095	1.9626	0.8910	0	60	0.4695	0.5317	1.8807	0.8829	0
	Cos	Cot	Tan	Sin	′		Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos	
0	0.4695	0.5317	1.8807	0.8829	**60**
1	0.4697	0.5321	1.8794	0.8828	59
2	0.4700	0.5325	1.8781	0.8827	58
3	0.4702	0.5328	1.8768	0.8825	57
4	0.4705	0.5332	1.8755	0.8824	56
5	0.4708	0.5336	1.8741	0.8823	55
6	0.4710	0.5340	1.8728	0.8821	54
7	0.4713	0.5343	1.8715	0.8820	53
8	0.4715	0.5347	1.8702	0.8819	52
9	0.4718	0.5351	1.8689	0.8817	51
10	0.4720	0.5354	1.8676	0.8816	**50**
11	0.4723	0.5358	1.8663	0.8814	49
12	0.4726	0.5362	1.8650	0.8813	48
13	0.4728	0.5366	1.8637	0.8812	47
14	0.4731	0.5369	1.8624	0.8810	46
15	0.4733	0.5373	1.8611	0.8809	45
16	0.4736	0.5377	1.8598	0.8808	44
17	0.4738	0.5381	1.8585	0.8806	43
18	0.4741	0.5384	1.8572	0.8805	42
19	0.4743	0.5388	1.8559	0.8803	41
20	0.4746	0.5392	1.8546	0.8802	**40**
21	0.4749	0.5396	1.8533	0.8801	39
22	0.4751	0.5399	1.8520	0.8799	38
23	0.4754	0.5403	1.8507	0.8798	37
24	0.4756	0.5407	1.8495	0.8796	36
25	0.4759	0.5411	1.8482	0.8795	35
26	0.4761	0.5415	1.8469	0.8794	34
27	0.4764	0.5418	1.8456	0.8792	33
28	0.4766	0.5422	1.8443	0.8791	32
29	0.4769	0.5426	1.8430	0.8790	31
30	0.4772	0.5430	1.8418	0.8788	**30**
31	0.4774	0.5433	1.8405	0.8787	29
32	0.4777	0.5437	1.8392	0.8785	28
33	0.4779	0.5441	1.8379	0.8784	27
34	0.4782	0.5445	1.8367	0.8783	26
35	0.4784	0.5448	1.8354	0.8781	25
36	0.4787	0.5452	1.8341	0.8780	24
37	0.4789	0.5456	1.8329	0.8778	23
38	0.4792	0.5460	1.8316	0.8777	22
39	0.4795	0.5464	1.8303	0.8776	21
40	0.4797	0.5467	1.8291	0.8774	**20**
41	0.4800	0.5471	1.8278	0.8773	19
42	0.4802	0.5475	1.8265	0.8771	18
43	0.4805	0.5479	1.8253	0.8770	17
44	0.4807	0.5482	1.8240	0.8769	16
45	0.4810	0.5486	1.8228	0.8767	15
46	0.4812	0.5490	1.8215	0.8766	14
47	0.4815	0.5494	1.8202	0.8764	13
48	0.4818	0.5498	1.8190	0.8763	12
49	0.4820	0.5501	1.8177	0.8762	11
50	0.4823	0.5505	1.8165	0.8760	**10**
51	0.4825	0.5509	1.8152	0.8759	9
52	0.4828	0.5513	1.8140	0.8757	8
53	0.4830	0.5517	1.8127	0.8756	7
54	0.4833	0.5520	1.8115	0.8755	6
55	0.4835	0.5524	1.8103	0.8753	5
56	0.4838	0.5528	1.8090	0.8752	4
57	0.4840	0.5532	1.8078	0.8750	3
58	0.4843	0.5535	1.8065	0.8749	2
59	0.4846	0.5539	1.8053	0.8748	1
60	0.4848	0.5543	1.8040	0.8746	**0**
	Cos	Cot	Tan	Sin	′

61°

′	Sin	Tan	Cot	Cos	
0	0.4848	0.5543	1.8040	0.8746	**60**
1	0.4851	0.5547	1.8028	0.8745	59
2	0.4853	0.5551	1.8016	0.8743	58
3	0.4856	0.5555	1.8003	0.8742	57
4	0.4858	0.5558	1.7991	0.8741	56
5	0.4861	0.5562	1.7979	0.8739	55
6	0.4863	0.5566	1.7966	0.8738	54
7	0.4866	0.5570	1.7954	0.8736	53
8	0.4868	0.5574	1.7942	0.8735	52
9	0.4871	0.5577	1.7930	0.8733	51
10	0.4874	0.5581	1.7917	0.8732	**50**
11	0.4876	0.5585	1.7905	0.8731	49
12	0.4879	0.5589	1.7893	0.8729	48
13	0.4881	0.5593	1.7881	0.8728	47
14	0.4884	0.5596	1.7868	0.8726	46
15	0.4886	0.5600	1.7856	0.8725	45
16	0.4889	0.5604	1.7844	0.8724	44
17	0.4891	0.5608	1.7832	0.8722	43
18	0.4894	0.5612	1.7820	0.8721	42
19	0.4896	0.5616	1.7808	0.8719	41
20	0.4899	0.5619	1.7796	0.8718	**40**
21	0.4901	0.5623	1.7783	0.8716	39
22	0.4904	0.5627	1.7771	0.8715	38
23	0.4907	0.5631	1.7759	0.8714	37
24	0.4909	0.5635	1.7747	0.8712	36
25	0.4912	0.5639	1.7735	0.8711	35
26	0.4914	0.5642	1.7723	0.8709	34
27	0.4917	0.5646	1.7711	0.8708	33
28	0.4919	0.5650	1.7699	0.8706	32
29	0.4922	0.5654	1.7687	0.8705	31
30	0.4924	0.5658	1.7675	0.8704	**30**
31	0.4927	0.5662	1.7663	0.8702	29
32	0.4929	0.5665	1.7651	0.8701	28
33	0.4932	0.5669	1.7639	0.8699	27
34	0.4934	0.5673	1.7627	0.8698	26
35	0.4937	0.5677	1.7615	0.8696	25
36	0.4939	0.5681	1.7603	0.8695	24
37	0.4942	0.5685	1.7591	0.8694	23
38	0.4944	0.5688	1.7579	0.8692	22
39	0.4947	0.5692	1.7567	0.8691	21
40	0.4950	0.5696	1.7556	0.8689	**20**
41	0.4952	0.5700	1.7544	0.8688	19
42	0.4955	0.5704	1.7532	0.8686	18
43	0.4957	0.5708	1.7520	0.8685	17
44	0.4960	0.5712	1.7508	0.8683	16
45	0.4962	0.5715	1.7496	0.8682	15
46	0.4965	0.5719	1.7485	0.8681	14
47	0.4967	0.5723	1.7473	0.8679	13
48	0.4970	0.5727	1.7461	0.8678	12
49	0.4972	0.5731	1.7449	0.8676	11
50	0.4975	0.5735	1.7437	0.8675	**10**
51	0.4977	0.5739	1.7426	0.8673	9
52	0.4980	0.5743	1.7414	0.8672	8
53	0.4982	0.5746	1.7402	0.8670	7
54	0.4985	0.5750	1.7391	0.8669	6
55	0.4987	0.5754	1.7379	0.8668	5
56	0.4990	0.5758	1.7367	0.8666	4
57	0.4992	0.5762	1.7355	0.8665	3
58	0.4995	0.5766	1.7344	0.8663	2
59	0.4997	0.5770	1.7332	0.8662	1
60	0.5000	0.5774	1.7321	0.8660	**0**
	Cos	Cot	Tan	Sin	′

60°

30°

′	Sin	Tan	Cot	Cos	
0	0.5000	0.5774	1.7321	0.8660	60
1	0.5003	0.5777	1.7309	0.8659	59
2	0.5005	0.5781	1.7297	0.8657	58
3	0.5008	0.5785	1.7286	0.8656	57
4	0.5010	0.5789	1.7274	0.8654	56
5	0.5013	0.5793	1.7262	0.8653	55
6	0.5015	0.5797	1.7251	0.8652	54
7	0.5018	0.5801	1.7239	0.8650	53
8	0.5020	0.5805	1.7228	0.8649	52
9	0.5023	0.5808	1.7216	0.8647	51
10	0.5025	0.5812	1.7205	0.8646	50
11	0.5028	0.5816	1.7193	0.8644	49
12	0.5030	0.5820	1.7182	0.8643	48
13	0.5033	0.5824	1.7170	0.8641	47
14	0.5035	0.5828	1.7159	0.8640	46
15	0.5038	0.5832	1.7147	0.8638	45
16	0.5040	0.5836	1.7136	0.8637	44
17	0.5043	0.5840	1.7124	0.8635	43
18	0.5045	0.5844	1.7113	0.8634	42
19	0.5048	0.5847	1.7102	0.8632	41
20	0.5050	0.5851	1.7090	0.8631	40
21	0.5053	0.5855	1.7079	0.8630	39
22	0.5055	0.5859	1.7067	0.8628	38
23	0.5058	0.5863	1.7056	0.8627	37
24	0.5660	0.5867	1.7045	0.8625	36
25	0.5063	0.5871	1.7033	0.8624	35
26	0.5065	0.5875	1.7022	0.8622	34
27	0.5068	0.5879	1.7011	0.8621	33
28	0.5070	0.5883	1.6999	0.8619	32
29	0.5073	0.5887	1.6988	0.8618	31
30	0.5075	0.5890	1.6977	0.8616	30
31	0.5078	0.5894	1.6965	0.8615	29
32	0.5080	0.5898	1.6954	0.8613	28
33	0.5083	0.5902	1.6943	0.8612	27
34	0.5085	0.5906	1.6932	0.8610	26
35	0.5088	0.5910	1.6920	0.8609	25
36	0.5090	0.5914	1.6909	0.8607	24
37	0.5093	0.5918	1.6898	0.8606	23
38	0.5095	0.5922	1.6887	0.8604	22
39	0.5098	0.5926	1.6875	0.8603	21
40	0.5100	0.5930	1.6864	0.8601	20
41	0.5103	0.5934	1.6853	0.8600	19
42	0.5105	0.5938	1.6842	0.8599	18
43	0.5108	0.5942	1.6831	0.8597	17
44	0.5110	0.5945	1.6820	0.8596	16
45	0.5113	0.5949	1.6808	0.8594	15
46	0.5115	0.5953	1.6797	0.8593	14
47	0.5118	0.5957	1.6786	0.8591	13
48	0.5120	0.5961	1.6775	0.8590	12
49	0.5123	0.5965	1.6764	0.8588	11
50	0.5125	0.5969	1.6753	0.8587	10
51	0.5128	0.5973	1.6742	0.8585	9
52	0.5130	0.5977	1.6731	0.8584	8
53	0.5133	0.5981	1.6720	0.8582	7
54	0.5135	0.5985	1.6709	0.8581	6
55	0.5138	0.5989	1.6698	0.8579	5
56	0.5140	0.5993	1.6687	0.8578	4
57	0.5143	0.5997	1.6676	0.8576	3
58	0.5145	0.6001	1.6665	0.8575	2
59	0.5148	0.6005	1.6654	0.8573	1
60	0.5150	0.6009	1.6643	0.8572	0
	Cos	Cot	Tan	Sin	′

59°

31°

′	Sin	Tan	Cot	Cos	
0	0.5150	0.6009	1.6643	0.8572	60
1	0.5153	0.6013	1.6632	0.8570	59
2	0.5155	0.6017	1.6621	0.8569	58
3	0.5158	0.6020	1.6610	0.8567	57
4	0.5160	0.6024	1.6599	0.8566	56
5	0.5163	0.6028	1.6588	0.8564	55
6	0.5165	0.6032	1.6577	0.8563	54
7	0.5168	0.6036	1.6566	0.8561	53
8	0.5170	0.6040	1.6555	0.8560	52
9	0.5173	0.6044	1.6545	0.8558	51
10	0.5175	0.6048	1.6534	0.8557	50
11	0.5178	0.6052	1.6523	0.8555	49
12	0.5180	0.6056	1.6512	0.8554	48
13	0.5183	0.6060	1.6501	0.8552	47
14	0.5185	0.6064	1.6490	0.8551	46
15	0.5188	0.6068	1.6479	0.8549	45
16	0.5190	0.6072	1.6469	0.8548	44
17	0.5193	0.6076	1.6458	0.8546	43
18	0.5195	0.6080	1.6447	0.8545	42
19	0.5198	0.6084	1.6436	0.8543	41
20	0.5200	0.6088	1.6426	0.8542	40
21	0.5203	0.6092	1.6415	0.8540	39
22	0.5205	0.6096	1.6404	0.8539	38
23	0.5208	0.6100	1.6393	0.8537	37
24	0.5210	0.6104	1.6383	0.8536	36
25	0.5213	0.6108	1.6372	0.8534	35
26	0.5215	0.6112	1.6361	0.8532	34
27	0.5218	0.6116	1.6351	0.8531	33
28	0.5220	0.6120	1.6340	0.8529	32
29	0.5223	0.6124	1.6329	0.8528	31
30	0.5225	0.6128	1.6319	0.8526	30
31	0.5227	0.6132	1.6308	0.8525	29
32	0.5230	0.6136	1.6297	0.8523	28
33	0.5232	0.6140	1.6287	0.8522	27
34	0.5235	0.6144	1.6276	0.8520	26
35	0.5237	0.6148	1.6265	0.8519	25
36	0.5240	0.6152	1.6255	0.8517	24
37	0.5242	0.6156	1.6244	0.8516	23
38	0.5245	0.6160	1.6234	0.8514	22
39	0.5247	0.6164	1.6223	0.8513	21
40	0.5250	0.6168	1.6212	0.8511	20
41	0.5252	0.6172	1.6202	0.8510	19
42	0.5255	0.6176	1.6191	0.8508	18
43	0.5257	0.6180	1.6181	0.8507	17
44	0.5260	0.6184	1.6170	0.8505	16
45	0.5262	0.6188	1.6160	0.8504	15
46	0.5265	0.6192	1.6149	0.8502	14
47	0.5267	0.6196	1.6139	0.8500	13
48	0.5270	0.6200	1.6128	0.8499	12
49	0.5272	0.6204	1.6118	0.8497	11
50	0.5275	0.6208	1.6107	0.8496	10
51	0.5277	0.6212	1.6097	0.8494	9
52	0.5279	0.6216	1.6087	0.8493	8
53	0.5282	0.6220	1.6076	0.8491	7
54	0.5284	0.6224	1.6066	0.8490	6
55	0.5287	0.6228	1.6055	0.8488	5
56	0.5289	0.6233	1.6045	0.8487	4
57	0.5292	0.6237	1.6034	0.8485	3
58	0.5294	0.6241	1.6024	0.8484	2
59	0.5297	0.6245	1.6014	0.8482	1
60	0.5299	0.6249	1.6003	0.8480	0
	Cos	Cot	Tan	Sin	′

58°

′	Sin	Tan	Cot	Cos		′	Sin	Tan	Cot	Cos	
0	0.5299	0.6249	1.6003	0.8480	60	0	0.5446	0.6494	1.5399	0.8387	60
1	0.5302	0.6253	1.5993	0.8479	59	1	0.5449	0.6498	1.5389	0.8385	59
2	0.5304	0.6257	1.5983	0.8477	58	2	0.5451	0.6502	1.5379	0.8384	58
3	0.5307	0.6261	1.5972	0.8476	57	3	0.5454	0.6506	1.5369	0.8382	57
4	0.5309	0.6265	1.5962	0.8474	56	4	0.5456	0.6511	1.5359	0.8380	56
5	0.5312	0.6269	1.5952	0.8473	55	5	0.5459	0.6515	1.5350	0.8379	55
6	0.5314	0.6273	1.5941	0.8471	54	6	0.5461	0.6519	1.5340	0.8377	54
7	0.5316	0.6277	1.5931	0.8470	53	7	0.5463	0.6523	1.5330	0.8376	53
8	0.5319	0.6281	1.5921	0.8468	52	8	0.5466	0.6527	1.5320	0.8374	52
9	0.5321	0.6285	1.5911	0.8467	51	9	0.5468	0.6531	1.5311	0.8372	51
10	0.5324	0.6289	1.5900	0.8465	50	10	0.5471	0.6536	1.5301	0.8371	50
11	0.5326	0.6293	1.5890	0.8463	49	11	0.5473	0.6540	1.5291	0.8369	49
12	0.5329	0.6297	1.5880	0.8462	48	12	0.5476	0.6544	1.5282	0.8368	48
13	0.5331	0.6301	1.5869	0.8460	47	13	0.5478	0.6548	1.5272	0.8366	47
14	0.5334	0.6305	1.5859	0.8459	46	14	0.5480	0.6552	1.5262	0.8364	46
15	0.5336	0.6310	1.5849	0.8457	45	15	0.5483	0.6556	1.5253	0.8363	45
16	0.5339	0.6314	1.5839	0.8456	44	16	0.5485	0.6560	1.5243	0.8361	44
17	0.5341	0.6318	1.5829	0.8454	43	17	0.5488	0.6565	1.5233	0.8360	43
18	0.5344	0.6322	1.5818	0.8453	42	18	0.5490	0.6569	1.5224	0.8358	42
19	0.5346	0.6326	1.5808	0.8451	41	19	0.5493	0.6573	1.5214	0.8356	41
20	0.5348	0.6330	1.5798	0.8450	40	20	0.5495	0.6577	1.5204	0.8355	40
21	0.5351	0.6334	1.5788	0.8448	39	21	0.5498	0.6581	1.5195	0.8353	39
22	0.5353	0.6338	1.5778	0.8446	38	22	0.5500	0.6585	1.5185	0.8352	38
23	0.5356	0.6342	1.5768	0.8445	37	23	0.5502	0.6590	1.5175	0.8350	37
24	0.5358	0.6346	1.5757	0.8443	36	24	0.5505	0.6594	1.5166	0.8348	36
25	0.5361	0.6350	1.5747	0.8442	35	25	0.5507	0.6598	1.5156	0.8347	35
26	0.5363	0.6354	1.5737	0.8440	34	26	0.5510	0.6602	1.5147	0.8345	34
27	0.5366	0.6358	1.5727	0.8439	33	27	0.5512	0.6606	1.5137	0.8344	33
28	0.5368	0.6363	1.5717	0.8437	32	28	0.5515	0.6610	1.5127	0.8342	32
29	0.5371	0.6367	1.5707	0.8435	31	29	0.5517	0.6615	1.5118	0.8340	31
30	0.5373	0.6371	1.5697	0.8434	30	30	0.5519	0.6619	1.5108	0.8339	30
31	0.5375	0.6375	1.5687	0.8432	29	31	0.5522	0.6623	1.5099	0.8337	29
32	0.5378	0.6379	1.5677	0.8431	28	32	0.5524	0.6627	1.5089	0.8336	28
33	0.5380	0.6383	1.5667	0.8429	27	33	0.5527	0.6631	1.5080	0.8334	27
34	0.5383	0.6387	1.5657	0.8428	26	34	0.5529	0.6636	1.5070	0.8332	26
35	0.5385	0.6391	1.5647	0.8426	25	35	0.5531	0.6640	1.5061	0.8331	25
36	0.5388	0.6395	1.5637	0.8425	24	36	0.5534	0.6644	1.5051	0.8329	24
37	0.5390	0.6399	1.5627	0.8423	23	37	0.5536	0.6648	1.5042	0.8328	23
38	0.5393	0.6403	1.5617	0.8421	22	38	0.5539	0.6652	1.5032	0.8326	22
39	0.5395	0.6408	1.5607	0.8420	21	39	0.5541	0.6657	1.5023	0.8324	21
40	0.5398	0.6412	1.5597	0.8418	20	40	0.5544	0.6661	1.5013	0.8323	20
41	0.5400	0.6416	1.5587	0.8417	19	41	0.5546	0.6665	1.5004	0.8321	19
42	0.5402	0.6420	1.5577	0.8415	18	42	0.5548	0.6669	1.4994	0.8320	18
43	0.5405	0.6424	1.5567	0.8414	17	43	0.5551	0.6673	1.4985	0.8318	17
44	0.5407	0.6428	1.5557	0.8412	16	44	0.5553	0.6678	1.4975	0.8316	16
45	0.5410	0.6432	1.5547	0.8410	15	45	0.5556	0.6682	1.4966	0.8315	15
46	0.5412	0.6436	1.5537	0.8409	14	46	0.5558	0.6686	1.4957	0.8313	14
47	0.5415	0.6440	1.5527	0.8407	13	47	0.5561	0.6690	1.4947	0.8311	13
48	0.5417	0.6445	1.5517	0.8406	12	48	0.5563	0.6694	1.4938	0.8310	12
49	0.5420	0.6449	1.5507	0.8404	11	49	0.5565	0.6699	1.4928	0.8308	11
50	0.5422	0.6453	1.5497	0.8403	10	50	0.5568	0.6703	1.4919	0.8307	10
51	0.5424	0.6457	1.5487	0.8401	9	51	0.5570	0.6707	1.4910	0.8305	9
52	0.5427	0.6461	1.5477	0.8399	8	52	0.5573	0.6711	1.4900	0.8303	8
53	0.5429	0.6465	1.5468	0.8398	7	53	0.5575	0.6715	1.4891	0.8302	7
54	0.5432	0.6469	1.5458	0.8396	6	54	0.5577	0.6720	1.4882	0.8300	6
55	0.5434	0.6473	1.5448	0.8395	5	55	0.5580	0.6724	1.4872	0.8298	5
56	0.5437	0.6478	1.5438	0.8393	4	56	0.5582	0.6728	1.4863	0.8297	4
57	0.5439	0.6482	1.5428	0.8391	3	57	0.5585	0.6732	1.4854	0.8295	3
58	0.5442	0.6486	1.5418	0.8390	2	58	0.5587	0.6737	1.4844	0.8294	2
59	0.5444	0.6490	1.5408	0.8388	1	59	0.5590	0.6741	1.4835	0.8292	1
60	0.5446	0.6494	1.5399	0.8387	0	60	0.5592	0.6745	1.4826	0.8290	0
	Cos	Cot	Tan	Sin	′		Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos			′	Sin	Tan	Cot	Cos	
0	0.5592	0.6745	1.4826	0.8290	60		0	0.5736	0.7002	1.4281	0.8192	60
1	0.5594	0.6749	1.4816	0.8289	59		1	0.5738	0.7006	1.4273	0.8190	59
2	0.5597	0.6754	1.4807	0.8287	58		2	0.5741	0.7011	1.4264	0.8188	58
3	0.5599	0.6758	1.4798	0.8285	57		3	0.5743	0.7015	1.4255	0.8187	57
4	0.5602	0.6762	1.4788	0.8284	56		4	0.5745	0.7019	1.4246	0.8185	56
5	0.5604	0.6766	1.4779	0.8282	55		5	0.5748	0.7024	1.4237	0.8183	55
6	0.5606	0.6771	1.4770	0.8281	54		6	0.5750	0.7028	1.4229	0.8181	54
7	0.5609	0.6775	1.4761	0.8279	53		7	0.5752	0.7032	1.4220	0.8180	53
8	0.5611	0.6779	1.4751	0.8277	52		8	0.5755	0.7037	1.4211	0.8178	52
9	0.5614	0.6783	1.4742	0.8276	51		9	0.5757	0.7041	1.4202	0.8176	51
10	0.5616	0.6787	1.4733	0.8274	50		10	0.5760	0.7046	1.4193	0.8175	50
11	0.5618	0.6792	1.4724	0.8272	49		11	0.5762	0.7050	1.4185	0.8173	49
12	0.5621	0.6796	1.4715	0.8271	48		12	0.5764	0.7054	1.4176	0.8171	48
13	0.5623	0.6800	1.4705	0.8269	47		13	0.5767	0.7059	1.4167	0.8170	47
14	0.5626	0.6805	1.4696	0.8268	46		14	0.5769	0.7063	1.4158	0.8168	46
15	0.5628	0.6809	1.4687	0.8266	45		15	0.5771	0.7067	1.4150	0.8166	45
16	0.5630	0.6813	1.4678	0.8264	44		16	0.5774	0.7072	1.4141	0.8165	44
17	0.5633	0.6817	1.4669	0.8263	43		17	0.5776	0.7076	1.4132	0.8163	43
18	0.5635	0.6822	1.4659	0.8261	42		18	0.5779	0.7080	1.4124	0.8161	42
19	0.5638	0.6826	1.4650	0.8259	41		19	0.5781	0.7085	1.4115	0.8160	41
20	0.5640	0.6830	1.4641	0.8258	40		20	0.5783	0.7089	1.4106	0.8158	40
21	0.5642	0.6834	1.4632	0.8256	39		21	0.5786	0.7094	1.4097	0.8156	39
22	0.5645	0.6839	1.4623	0.8254	38		22	0.5788	0.7098	1.4089	0.8155	38
23	0.5647	0.6843	1.4614	0.8253	37		23	0.5790	0.7102	1.4080	0.8153	37
24	0.5650	0.6847	1.4605	0.8251	36		24	0.5793	0.7107	1.4071	0.8151	36
25	0.5652	0.6851	1.4596	0.8249	35		25	0.5795	0.7111	1.4063	0.8150	35
26	0.5654	0.6856	1.4586	0.8248	34		26	0.5798	0.7115	1.4054	0.8148	34
27	0.5657	0.6860	1.4577	0.8246	33		27	0.5800	0.7120	1.4045	0.8146	33
28	0.5659	0.6864	1.4568	0.8245	32		28	0.5802	0.7124	1.4037	0.8145	32
29	0.5662	0.6869	1.4559	0.8243	31		29	0.5805	0.7129	1.4028	0.8143	31
30	0.5664	0.6873	1.4550	0.8241	30		30	0.5807	0.7133	1.4019	0.8141	30
31	0.5666	0.6877	1.4541	0.8240	29		31	0.5809	0.7137	1.4011	0.8139	29
32	0.5669	0.6881	1.4532	0.8238	28		32	0.5812	0.7142	1.4002	0.8138	28
33	0.5671	0.6886	1.4523	0.8236	27		33	0.5814	0.7146	1.3994	0.8136	27
34	0.5674	0.6890	1.4514	0.8235	26		34	0.5816	0.7151	1.3985	0.8134	26
35	0.5676	0.6894	1.4505	0.8233	25		35	0.5819	0.7155	1.3976	0.8133	25
36	0.5678	0.6899	1.4496	0.8231	24		36	0.5821	0.7159	1.3968	0.8131	24
37	0.5681	0.6903	1.4487	0.8230	23		37	0.5824	0.7164	1.3959	0.8129	23
38	0.5683	0.6907	1.4478	0.8228	22		38	0.5826	0.7168	1.3951	0.8128	22
39	0.5686	0.6911	1.4469	0.8226	21		39	0.5828	0.7173	1.3942	0.8126	21
40	0.5688	0.6916	1.4460	0.8225	20		40	0.5831	0.7177	1.3934	0.8124	20
41	0.5690	0.6920	1.4451	0.8223	19		41	0.5833	0.7181	1.3925	0.8123	19
42	0.5693	0.6924	1.4442	0.8221	18		42	0.5835	0.7186	1.3916	0.8121	18
43	0.5695	0.6929	1.4433	0.8220	17		43	0.5838	0.7190	1.3908	0.8119	17
44	0.5698	0.6933	1.4424	0.8218	16		44	0.5840	0.7195	1.3899	0.8117	16
45	0.5700	0.6937	1.4415	0.8216	15		45	0.5842	0.7199	1.3891	0.8116	15
46	0.5702	0.6942	1.4406	0.8215	14		46	0.5845	0.7203	1.3882	0.8114	14
47	0.5705	0.6946	1.4397	0.8213	13		47	0.5847	0.7208	1.3874	0.8112	13
48	0.5707	0.6950	1.4388	0.8211	12		48	0.5850	0.7212	1.3865	0.8111	12
49	0.5710	0.6954	1.4379	0.8210	11		49	0.5852	0.7217	1.3857	0.8109	11
50	0.5712	0.6959	1.4370	0.8208	10		50	0.5854	0.7221	1.3848	0.8107	10
51	0.5714	0.6963	1.4361	0.8207	9		51	0.5857	0.7226	1.3840	0.8106	9
52	0.5717	0.6967	1.4352	0.8205	8		52	0.5859	0.7230	1.3831	0.8104	8
53	0.5719	0.6972	1.4344	0.8203	7		53	0.5861	0.7234	1.3823	0.8102	7
54	0.5721	0.6976	1.4335	0.8202	6		54	0.5864	0.7239	1.3814	0.8100	6
55	0.5724	0.6980	1.4326	0.8200	5		55	0.5866	0.7243	1.3806	0.8099	5
56	0.5726	0.6985	1.4317	0.8198	4		56	0.5868	0.7248	1.3798	0.8097	4
57	0.5729	0.6989	1.4308	0.8197	3		57	0.5871	0.7252	1.3789	0.8095	3
58	0.5731	0.6993	1.4299	0.8195	2		58	0.5873	0.7257	1.3781	0.8094	2
59	0.5733	0.6998	1.4290	0.8193	1		59	0.5875	0.7261	1.3772	0.8092	1
60	0.5736	0.7002	1.4281	0.8192	0		60	0.5878	0.7265	1.3764	0.8090	0
	Cos	Cot	Tan	Sin	′			Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos	
0	0.5878	0.7265	1.3764	0.8090	60
1	0.5880	0.7270	1.3755	0.8088	59
2	0.5883	0.7274	1.3747	0.8087	58
3	0.5885	0.7279	1.3739	0.8085	57
4	0.5887	0.7283	1.3730	0.8083	56
5	0.5890	0.7288	1.3722	0.8082	55
6	0.5892	0.7292	1.3713	0.8080	54
7	0.5894	0.7297	1.3705	0.8078	53
8	0.5897	0.7301	1.3697	0.8076	52
9	0.5899	0.7306	1.3688	0.8075	51
10	0.5901	0.7310	1.3680	0.8073	50
11	0.5904	0.7314	1.3672	0.8071	49
12	0.5906	0.7319	1.3663	0.8070	48
13	0.5908	0.7323	1.3655	0.8068	47
14	0.5911	0.7328	1.3647	0.8066	46
15	0.5913	0.7332	1.3638	0.8064	45
16	0.5915	0.7337	1.3630	0.8063	44
17	0.5918	0.7341	1.3622	0.8061	43
18	0.5920	0.7346	1.3613	0.8059	42
19	0.5922	0.7350	1.3605	0.8058	41
20	0.5925	0.7355	1.3597	0.8056	40
21	0.5927	0.7359	1.3588	0.8054	39
22	0.5930	0.7364	1.3580	0.8052	38
23	0.5932	0.7368	1.3572	0.8051	37
24	0.5934	0.7373	1.3564	0.8049	36
25	0.5937	0.7377	1.3555	0.8047	35
26	0.5939	0.7382	1.3547	0.8045	34
27	0.5941	0.7386	1.3539	0.8044	33
28	0.5944	0.7391	1.3531	0.8042	32
29	0.5946	0.7395	1.3522	0.8040	31
30	0.5948	0.7400	1.3514	0.8039	30
31	0.5951	0.7404	1.3506	0.8037	29
32	0.5953	0.7409	1.3498	0.8035	28
33	0.5955	0.7413	1.3490	0.8033	27
34	0.5958	0.7418	1.3481	0.8032	26
35	0.5960	0.7422	1.3473	0.8030	25
36	0.5962	0.7427	1.3465	0.8028	24
37	0.5965	0.7431	1.3457	0.8026	23
38	0.5967	0.7436	1.3449	0.8025	22
39	0.5969	0.7440	1.3440	0.8023	21
40	0.5972	0.7445	1.3432	0.8021	20
41	0.5974	0.7449	1.3424	0.8019	19
42	0.5976	0.7454	1.3416	0.8018	18
43	0.5979	0.7458	1.3408	0.8016	17
44	0.5981	0.7463	1.3400	0.8014	16
45	0.5983	0.7467	1.3392	0.8013	15
46	0.5986	0.7472	1.3384	0.8011	14
47	0.5988	0.7476	1.3375	0.8009	13
48	0.5990	0.7481	1.3367	0.8007	12
49	0.5993	0.7485	1.3359	0.8006	11
50	0.5995	0.7490	1.3351	0.8004	10
51	0.5997	0.7495	1.3343	0.8002	9
52	0.6000	0.7499	1.3335	0.8000	8
53	0.6002	0.7504	1.3327	0.7999	7
54	0.6004	0.7508	1.3319	0.7997	6
55	0.6007	0.7513	1.3311	0.7995	5
56	0.6009	0.7517	1.3303	0.7993	4
57	0.6011	0.7522	1.3295	0.7992	3
58	0.6014	0.7526	1.3287	0.7990	2
59	0.6016	0.7531	1.3278	0.7988	1
60	0.6018	0.7536	1.3270	0.7986	0
	Cos	Cot	Tan	Sin	′

′	Sin	Tan	Cot	Cos	
0	0.6018	0.7536	1.3270	0.7986	60
1	0.6020	0.7540	1.3262	0.7985	59
2	0.6023	0.7545	1.3254	0.7983	58
3	0.6025	0.7549	1.3246	0.7981	57
4	0.6027	0.7554	1.3238	0.7979	56
5	0.6030	0.7558	1.3230	0.7978	55
6	0.6032	0.7563	1.3222	0.7976	54
7	0.6034	0.7568	1.3214	0.7974	53
8	0.6037	0.7572	1.3206	0.7972	52
9	0.6039	0.7577	1.3198	0.7971	51
10	0.6041	0.7581	1.3190	0.7969	50
11	0.6044	0.7586	1.3182	0.7967	49
12	0.6046	0.7590	1.3175	0.7965	48
13	0.6048	0.7595	1.3167	0.7964	47
14	0.6051	0.7600	1.3159	0.7962	46
15	0.6053	0.7604	1.3151	0.7960	45
16	0.6055	0.7609	1.3143	0.7958	44
17	0.6058	0.7613	1.3135	0.7956	43
18	0.6060	0.7618	1.3127	0.7955	42
19	0.6062	0.7623	1.3119	0.7953	41
20	0.6065	0.7627	1.3111	0.7951	40
21	0.6067	0.7632	1.3103	0.7949	39
22	0.6069	0.7636	1.3095	0.7948	38
23	0.6071	0.7641	1.3087	0.7946	37
24	0.6074	0.7646	1.3079	0.7944	36
25	0.6076	0.7650	1.3072	0.7942	35
26	0.6078	0.7655	1.3064	0.7941	34
27	0.6081	0.7659	1.3056	0.7939	33
28	0.6083	0.7664	1.3048	0.7937	32
29	0.6085	0.7669	1.3040	0.7935	31
30	0.6088	0.7673	1.3032	0.7934	30
31	0.6090	0.7678	1.3024	0.7932	29
32	0.6092	0.7683	1.3017	0.7930	28
33	0.6095	0.7687	1.3009	0.7928	27
34	0.6097	0.7692	1.3001	0.7926	26
35	0.6099	0.7696	1.2993	0.7925	25
36	0.6101	0.7701	1.2985	0.7923	24
37	0.6104	0.7706	1.2977	0.7921	23
38	0.6106	0.7710	1.2970	0.7919	22
39	0.6108	0.7715	1.2962	0.7918	21
40	0.6111	0.7720	1.2954	0.7916	20
41	0.6113	0.7724	1.2946	0.7914	19
42	0.6115	0.7729	1.2938	0.7912	18
43	0.6118	0.7734	1.2931	0.7910	17
44	0.6120	0.7738	1.2923	0.7909	16
45	0.6122	0.7743	1.2915	0.7907	15
46	0.6124	0.7747	1.2907	0.7905	14
47	0.6127	0.7752	1.2900	0.7903	13
48	0.6129	0.7757	1.2892	0.7902	12
49	0.6131	0.7761	1.2884	0.7900	11
50	0.6134	0.7766	1.2876	0.7898	10
51	0.6136	0.7771	1.2869	0.7896	9
52	0.6138	0.7775	1.2861	0.7894	8
53	0.6141	0.7780	1.2853	0.7893	7
54	0.6143	0.7785	1.2846	0.7891	6
55	0.6145	0.7789	1.2838	0.7889	5
56	0.6147	0.7794	1.2830	0.7887	4
57	0.6150	0.7799	1.2822	0.7885	3
58	0.6152	0.7803	1.2815	0.7884	2
59	0.6154	0.7808	1.2807	0.7882	1
60	0.6157	0.7813	1.2799	0.7880	0
	Cos	Cot	Tan	Sin	′

	38°							39°				
′	Sin	Tan	Cot	Cos			′	Sin	Tan	Cot	Cos	
0	0.6157	0.7813	1.2799	0.7880	60		0	0.6293	0.8098	1.2349	0.7771	60
1	0.6159	0.7818	1.2792	0.7878	59		1	0.6295	0.8103	1.2342	0.7770	59
2	0.6161	0.7822	1.2784	0.7877	58		2	0.6298	0.8107	1.2334	0.7768	58
3	0.6163	0.7827	1.2776	0.7875	57		3	0.6300	0.8112	1.2327	0.7766	57
4	0.6166	0.7832	1.2769	0.7873	56		4	0.6302	0.8117	1.2320	0.7764	56
5	0.6168	0.7836	1.2761	0.7871	55		5	0.6305	0.8122	1.2312	0.7762	55
6	0.6170	0.7841	1.2753	0.7869	54		6	0.6307	0.8127	1.2305	0.7760	54
7	0.6173	0.7846	1.2746	0.7868	53		7	0.6309	0.8132	1.2298	0.7759	53
8	0.6175	0.7850	1.2738	0.7866	52		8	0.6311	0.8136	1.2290	0.7757	52
9	0.6177	0.7855	1.2731	0.7864	51		9	0.6314	0.8141	1.2283	0.7755	51
10	0.6180	0.7860	1.2723	0.7862	50		10	0.6316	0.8146	1.2276	0.7753	50
11	0.6182	0.7865	1.2715	0.7860	49		11	0.6318	0.8151	1.2268	0.7751	49
12	0.6184	0.7869	1.2708	0.7859	48		12	0.6320	0.8156	1.2261	0.7749	48
13	0.6186	0.7874	1.2700	0.7857	47		13	0.6323	0.8161	1.2254	0.7748	47
14	0.6189	0.7879	1.2693	0.7855	46		14	0.6325	0.8165	1.2247	0.7746	46
15	0.6191	0.7883	1.2685	0.7853	45		15	0.6327	0.8170	1.2239	0.7744	45
16	0.6193	0.7888	1.2677	0.7851	44		16	0.6329	0.8175	1.2232	0.7742	44
17	0.6196	0.7893	1.2670	0.7850	43		17	0.6332	0.8180	1.2225	0.7740	43
18	0.6198	0.7898	1.2662	0.7848	42		18	0.6334	0.8185	1.2218	0.7738	42
19	0.6200	0.7902	1.2655	0.7846	41		19	0.6336	0.8190	1.2210	0.7737	41
20	0.6202	0.7907	1.2647	0.7844	40		20	0.6338	0.8195	1.2203	0.7735	40
21	0.6205	0.7912	1.2640	0.7842	39		21	0.6341	0.8199	1.2196	0.7733	39
22	0.6207	0.7916	1.2632	0.7841	38		22	0.6343	0.8204	1.2189	0.7731	38
23	0.6209	0.7921	1.2624	0.7839	37		23	0.6345	0.8209	1.2181	0.7729	37
24	0.6211	0.7926	1.2617	0.7837	36		24	0.6347	0.8214	1.2174	0.7727	36
25	0.6214	0.7931	1.2609	0.7835	35		25	0.6350	0.8219	1.2167	0.7725	35
26	0.6216	0.7935	1.2602	0.7833	34		26	0.6352	0.8224	1.2160	0.7724	34
27	0.6218	0.7940	1.2594	0.7832	33		27	0.6354	0.8229	1.2153	0.7722	33
28	0.6221	0.7945	1.2587	0.7830	32		28	0.6356	0.8234	1.2145	0.7720	32
29	0.6223	0.7950	1.2579	0.7828	31		29	0.6359	0.8238	1.2138	0.7718	31
30	0.6225	0.7954	1.2572	0.7826	30		30	0.6361	0.8243	1.2131	0.7716	30
31	0.6227	0.7959	1.2564	0.7824	29		31	0.6363	0.8248	1.2124	0.7714	29
32	0.6230	0.7964	1.2557	0.7822	28		32	0.6365	0.8253	1.2117	0.7713	28
33	0.6232	0.7969	1.2549	0.7821	27		33	0.6368	0.8258	1.2109	0.7711	27
34	0.6234	0.7973	1.2542	0.7819	26		34	0.6370	0.8263	1.2102	0.7709	26
35	0.6237	0.7978	1.2534	0.7817	25		35	0.6372	0.8268	1.2095	0.7707	25
36	0.6239	0.7983	1.2527	0.7815	24		36	0.6374	0.8273	1.2088	0.7705	24
37	0.6241	0.7988	1.2519	0.7813	23		37	0.6376	0.8278	1.2081	0.7703	23
38	0.6243	0.7992	1.2512	0.7812	22		38	0.6379	0.8283	1.2074	0.7701	22
39	0.6246	0.7997	1.2504	0.7810	21		39	0.6381	0.8287	1.2066	0.7700	21
40	0.6248	0.8002	1.2497	0.7808	20		40	0.6383	0.8292	1.2059	0.7698	20
41	0.6250	0.8007	1.2489	0.7806	19		41	0.6385	0.8297	1.2052	0.7696	19
42	0.6252	0.8012	1.2482	0.7804	18		42	0.6388	0.8302	1.2045	0.7694	18
43	0.6255	0.8016	1.2475	0.7802	17		43	0.6390	0.8307	1.2038	0.7692	17
44	0.6257	0.8021	1.2467	0.7801	16		44	0.6392	0.8312	1.2031	0.7690	16
45	0.6259	0.8026	1.2460	0.7799	15		45	0.6394	0.8317	1.2024	0.7688	15
46	0.6262	0.8031	1.2452	0.7797	14		46	0.6397	0.8322	1.2017	0.7687	14
47	0.6264	0.8035	1.2445	0.7795	13		47	0.6399	0.8327	1.2009	0.7685	13
48	0.6266	0.8040	1.2437	0.7793	12		48	0.6401	0.8332	1.2002	0.7683	12
49	0.6268	0.8045	1.2430	0.7792	11		49	0.6403	0.8337	1.1995	0.7681	11
50	0.6271	0.8050	1.2423	0.7790	10		50	0.6406	0.8342	1.1988	0.7679	10
51	0.6273	0.8055	1.2415	0.7788	9		51	0.6408	0.8346	1.1981	0.7677	9
52	0.6275	0.8059	1.2408	0.7786	8		52	0.6410	0.8351	1.1974	0.7675	8
53	0.6277	0.8064	1.2401	0.7784	7		53	0.6412	0.8356	1.1967	0.7674	7
54	0.6280	0.8069	1.2393	0.7782	6		54	0.6414	0.8361	1.1960	0.7672	6
55	0.6282	0.8074	1.2386	0.7781	5		55	0.6417	0.8366	1.1953	0.7670	5
56	0.6284	0.8079	1.2378	0.7779	4		56	0.6419	0.8371	1.1946	0.7668	4
57	0.6286	0.8083	1.2371	0.7777	3		57	0.6421	0.8376	1.1939	0.7666	3
58	0.6289	0.8088	1.2364	0.7775	2		58	0.6423	0.8381	1.1932	0.7664	2
59	0.6291	0.8093	1.2356	0.7773	1		59	0.6426	0.8386	1.1925	0.7662	1
60	0.6293	0.8098	1.2349	0.7771	0		60	0.6428	0.8391	1.1918	0.7660	0
	Cos	Cot	Tan	Sin	′			Cos	Cot	Tan	Sin	′

| | 51° | | | 50° | |

	40°						41°				
′	Sin	Tan	Cot	Cos		′	Sin	Tan	Cot	Cos	
0	0.6428	0.8391	1.1918	0.7660	60	0	0.6561	0.8693	1.1504	0.7547	60
1	0.6430	0.8396	1.1910	0.7659	59	1	0.6563	0.8698	1.1497	0.7545	59
2	0.6432	0.8401	1.1903	0.7657	58	2	0.6565	0.8703	1.1490	0.7543	58
3	0.6435	0.8406	1.1896	0.7655	57	3	0.6567	0.8708	1.1483	0.7541	57
4	0.6437	0.8411	1.1889	0.7653	56	4	0.6569	0.8713	1.1477	0.7539	56
5	0.6439	0.8416	1.1882	0.7651	55	5	0.6572	0.8718	1.1470	0.7538	55
6	0.6441	0.8421	1.1875	0.7649	54	6	0.6574	0.8724	1.1463	0.7536	54
7	0.6443	0.8426	1.1868	0.7647	53	7	0.6576	0.8729	1.1456	0.7534	53
8	0.6446	0.8431	1.1861	0.7645	52	8	0.6578	0.8734	1.1450	0.7532	52
9	0.6448	0.8436	1.1854	0.7644	51	9	0.6580	0.8739	1.1443	0.7530	51
10	0.6450	0.8441	1.1847	0.7642	50	10	0.6583	0.8744	1.1436	0.7528	50
11	0.6452	0.8446	1.1840	0.7640	49	11	0.6585	0.8749	1.1430	0.7526	49
12	0.6455	0.8451	1.1833	0.7638	48	12	0.6587	0.8754	1.1423	0.7524	48
13	0.6457	0.8456	1.1826	0.7636	47	13	0.6589	0.8759	1.1416	0.7522	47
14	0.6459	0.8461	1.1819	0.7634	46	14	0.6591	0.8765	1.1410	0.7520	46
15	0.6461	0.8466	1.1812	0.7632	45	15	0.6593	0.8770	1.1403	0.7518	45
16	0.6463	0.8471	1.1806	0.7630	44	16	0.6596	0.8775	1.1396	0.7516	44
17	0.6466	0.8476	1.1799	0.7629	43	17	0.6598	0.8780	1.1389	0.7515	43
18	0.6468	0.8481	1.1792	0.7627	42	18	0.6600	0.8785	1.1383	0.7513	42
19	0.6470	0.8486	1.1785	0.7625	41	19	0.6602	0.8790	1.1376	0.7511	41
20	0.6472	0.8491	1.1778	0.7623	40	20	0.6604	0.8796	1.1369	0.7509	40
21	0.6475	0.8496	1.1771	0.7621	39	21	0.6607	0.8801	1.1363	0.7507	39
22	0.6477	0.8501	1.1764	0.7619	38	22	0.6609	0.8806	1.1356	0.7505	38
23	0.6479	0.8506	1.1757	0.7617	37	23	0.6611	0.8811	1.1349	0.7503	37
24	0.6481	0.8511	1.1750	0.7615	36	24	0.6613	0.8816	1.1343	0.7501	36
25	0.6483	0.8516	1.1743	0.7613	35	25	0.6615	0.8821	1.1336	0.7499	35
26	0.6486	0.8521	1.1736	0.7612	34	26	0.6617	0.8827	1.1329	0.7497	34
27	0.6488	0.8526	1.1729	0.7610	33	27	0.6620	0.8832	1.1323	0.7495	33
28	0.6490	0.8531	1.1722	0.7608	32	28	0.6622	0.8837	1.1316	0.7493	32
29	0.6492	0.8536	1.1715	0.7606	31	29	0.6624	0.8842	1.1310	0.7491	31
30	0.6494	0.8541	1.1708	0.7604	30	30	0.6626	0.8847	1.1303	0.7490	30
31	0.6497	0.8546	1.1702	0.7602	29	31	0.6628	0.8852	1.1296	0.7488	29
32	0.6499	0.8551	1.1695	0.7600	28	32	0.6631	0.8858	1.1290	0.7486	28
33	0.6501	0.8556	1.1688	0.7598	27	33	0.6633	0.8863	1.1283	0.7484	27
34	0.6503	0.8561	1.1681	0.7596	26	34	0.6635	0.8868	1.1276	0.7482	26
35	0.6506	0.8566	1.1674	0.7595	25	35	0.6637	0.8873	1.1270	0.7480	25
36	0.6508	0.8571	1.1667	0.7593	24	36	0.6639	0.8878	1.1263	0.7478	24
37	0.6510	0.8576	1.1660	0.7591	23	37	0.6641	0.8884	1.1257	0.7476	23
38	0.6512	0.8581	1.1653	0.7589	22	38	0.6644	0.8889	1.1250	0.7474	22
39	0.6514	0.8586	1.1647	0.7587	21	39	0.6646	0.8894	1.1243	0.7472	21
40	0.6517	0.8591	1.1640	0.7585	20	40	0.6648	0.8899	1.1237	0.7470	20
41	0.6519	0.8596	1.1633	0.7583	19	41	0.6650	0.8904	1.1230	0.7468	19
42	0.6521	0.8601	1.1626	0.7581	18	42	0.6652	0.8910	1.1224	0.7466	18
43	0.6523	0.8606	1.1619	0.7579	17	43	0.6654	0.8915	1.1217	0.7464	17
44	0.6525	0.8611	1.1612	0.7578	16	44	0.6657	0.8920	1.1211	0.7463	16
45	0.6528	0.8617	1.1606	0.7576	15	45	0.6659	0.8925	1.1204	0.7461	15
46	0.6530	0.8622	1.1599	0.7574	14	46	0.6661	0.8931	1.1197	0.7459	14
47	0.6532	0.8627	1.1592	0.7572	13	47	0.6663	0.8936	1.1191	0.7457	13
48	0.6534	0.8632	1.1585	0.7570	12	48	0.6665	0.8941	1.1184	0.7455	12
49	0.6536	0.8637	1.1578	0.7568	11	49	0.6667	0.8946	1.1178	0.7453	11
50	0.6539	0.8642	1.1571	0.7566	10	50	0.6670	0.8952	1.1171	0.7451	10
51	0.6541	0.8647	1.1565	0.7564	9	51	0.6672	0.8957	1.1165	0.7449	9
52	0.6543	0.8652	1.1558	0.7562	8	52	0.6674	0.8962	1.1158	0.7447	8
53	0.6545	0.8657	1.1551	0.7560	7	53	0.6676	0.8967	1.1152	0.7445	7
54	0.6547	0.8662	1.1544	0.7559	6	54	0.6678	0.8972	1.1145	0.7443	6
55	0.6550	0.8667	1.1538	0.7557	5	55	0.6680	0.8978	1.1139	0.7441	5
56	0.6552	0.8672	1.1531	0.7555	4	56	0.6683	0.8983	1.1132	0.7439	4
57	0.6554	0.8678	1.1524	0.7553	3	57	0.6685	0.8988	1.1126	0.7437	3
58	0.6556	0.8683	1.1517	0.7551	2	58	0.6687	0.8994	1.1119	0.7435	2
59	0.6558	0.8688	1.1510	0.7549	1	59	0.6689	0.8999	1.1113	0.7433	1
60	0.6561	0.8693	1.1504	0.7547	0	60	0.6691	0.9004	1.1106	0.7431	0
	Cos	Cot	Tan	Sin	′		Cos	Cot	Tan	Sin	′

| | 49° | | | | | | 48° | | | | |

′	Sin	Tan	Cot	Cos	
0	0.6691	0.9004	1.1106	0.7431	60
1	0.6693	0.9009	1.1100	0.7430	59
2	0.6696	0.9015	1.1093	0.7428	58
3	0.6698	0.9020	1.1087	0.7426	57
4	0.6700	0.9025	1.1080	0.7424	56
5	0.6702	0.9030	1.1074	0.7422	55
6	0.6704	0.9036	1.1067	0.7420	54
7	0.6706	0.9041	1.1061	0.7418	53
8	0.6709	0.9046	1.1054	0.7416	52
9	0.6711	0.9052	1.1048	0.7414	51
10	0.6713	0.9057	1.1041	0.7412	50
11	0.6715	0.9062	1.1035	0.7410	49
12	0.6717	0.9067	1.1028	0.7408	48
13	0.6719	0.9073	1.1022	0.7406	47
14	0.6722	0.9078	1.1016	0.7404	46
15	0.6724	0.9083	1.1009	0.7402	45
16	0.6726	0.9089	1.1003	0.7400	44
17	0.6728	0.9094	1.0996	0.7398	43
18	0.6730	0.9099	1.0990	0.7396	42
19	0.6732	0.9105	1.0983	0.7394	41
20	0.6734	0.9110	1.0977	0.7392	40
21	0.6737	0.9115	1.0971	0.7390	39
22	0.6739	0.9121	1.0964	0.7388	38
23	0.6741	0.9126	1.0958	0.7387	37
24	0.6743	0.9131	1.0951	0.7385	36
25	0.6745	0.9137	1.0945	0.7383	35
26	0.6747	0.9142	1.0939	0.7381	34
27	0.6749	0.9147	1.0932	0.7379	33
28	0.6752	0.9153	1.0926	0.7377	32
29	0.6754	0.9158	1.0919	0.7375	31
30	0.6756	0.9163	1.0913	0.7373	30
31	0.6758	0.9169	1.0907	0.7371	29
32	0.6760	0.9174	1.0900	0.7369	28
33	0.6762	0.9179	1.0894	0.7367	27
34	0.6764	0.9185	1.0888	0.7365	26
35	0.6767	0.9190	1.0881	0.7363	25
36	0.6769	0.9195	1.0875	0.7361	24
37	0.6771	0.9201	1.0869	0.7359	23
38	0.6773	0.9206	1.0862	0.7357	22
39	0.6775	0.9212	1.0856	0.7355	21
40	0.6777	0.9217	1.0850	0.7353	20
41	0.6779	0.9222	1.0843	0.7351	19
42	0.6782	0.9228	1.0837	0.7349	18
43	0.6784	0.9233	1.0831	0.7347	17
44	0.6786	0.9239	1.0824	0.7345	16
45	0.6788	0.9244	1.0818	0.7343	15
46	0.6790	0.9249	1.0812	0.7341	14
47	0.6792	0.9255	1.0805	0.7339	13
48	0.6794	0.9260	1.0799	0.7337	12
49	0.6797	0.9266	1.0793	0.7335	11
50	0.6799	0.9271	1.0786	0.7333	10
51	0.6801	0.9276	1.0780	0.7331	9
52	0.6803	0.9282	1.0774	0.7329	8
53	0.6805	0.9287	1.0768	0.7327	7
54	0.6807	0.9293	1.0761	0.7325	6
55	0.6809	0.9298	1.0755	0.7323	5
56	0.6811	0.9303	1.0749	0.7321	4
57	0.6814	0.9309	1.0742	0.7319	3
58	0.6816	0.9314	1.0736	0.7318	2
59	0.6818	0.9320	1.0730	0.7316	1
60	0.6820	0.9325	1.0724	0.7314	0
	Cos	Cot	Tan	Sin	′

47°

′	Sin	Tan	Cot	Cos	
0	0.6820	0.9325	1.0724	0.7314	60
1	0.6822	0.9331	1.0717	0.7312	59
2	0.6824	0.9336	1.0711	0.7310	58
3	0.6826	0.9341	1.0705	0.7308	57
4	0.6828	0.9347	1.0699	0.7306	56
5	0.6831	0.9352	1.0692	0.7304	55
6	0.6833	0.9358	1.0686	0.7302	54
7	0.6835	0.9363	1.0680	0.7300	53
8	0.6837	0.9369	1.0674	0.7298	52
9	0.6839	0.9374	1.0668	0.7296	51
10	0.6841	0.9380	1.0661	0.7294	50
11	0.6843	0.9385	1.0655	0.7292	49
12	0.6845	0.9391	1.0649	0.7290	48
13	0.6848	0.9396	1.0643	0.7288	47
14	0.6850	0.9402	1.0637	0.7286	46
15	0.6852	0.9407	1.0630	0.7284	45
16	0.6854	0.9413	1.0624	0.7282	44
17	0.6856	0.9418	1.0618	0.7280	43
18	0.6858	0.9424	1.0612	0.7278	42
19	0.6860	0.9429	1.0606	0.7276	41
20	0.6862	0.9435	1.0599	0.7274	40
21	0.6865	0.9440	1.0593	0.7272	39
22	0.6867	0.9446	1.0587	0.7270	38
23	0.6869	0.9451	1.0581	0.7268	37
24	0.6871	0.9457	1.0575	0.7266	36
25	0.6873	0.9462	1.0569	0.7264	35
26	0.6875	0.9468	1.0562	0.7262	34
27	0.6877	0.9473	1.0556	0.7260	33
28	0.6879	0.9479	1.0550	0.7258	32
29	0.6881	0.9484	1.0544	0.7256	31
30	0.6884	0.9490	1.0538	0.7254	30
31	0.6886	0.9495	1.0532	0.7252	29
32	0.6888	0.9501	1.0526	0.7250	28
33	0.6890	0.9506	1.0519	0.7248	27
34	0.6892	0.9512	1.0513	0.7246	26
35	0.6894	0.9517	1.0507	0.7244	25
36	0.6896	0.9523	1.0501	0.7242	24
37	0.6898	0.9528	1.0495	0.7240	23
38	0.6900	0.9534	1.0489	0.7238	22
39	0.6903	0.9540	1.0483	0.7236	21
40	0.6905	0.9545	1.0477	0.7234	20
41	0.6907	0.9551	1.0470	0.7232	19
42	0.6909	0.9556	1.0464	0.7230	18
43	0.6911	0.9562	1.0458	0.7228	17
44	0.6913	0.9567	1.0452	0.7226	16
45	0.6915	0.9573	1.0446	0.7224	15
46	0.6917	0.9578	1.0440	0.7222	14
47	0.6919	0.9584	1.0434	0.7220	13
48	0.6921	0.9590	1.0428	0.7218	12
49	0.6924	0.9595	1.0422	0.7216	11
50	0.6926	0.9601	1.0416	0.7214	10
51	0.6928	0.9606	1.0410	0.7212	9
52	0.6930	0.9612	1.0404	0.7210	8
53	0.6932	0.9618	1.0398	0.7208	7
54	0.6934	0.9623	1.0392	0.7206	6
55	0.6936	0.9629	1.0385	0.7203	5
56	0.6938	0.9634	1.0379	0.7201	4
57	0.6940	0.9640	1.0373	0.7199	3
58	0.6942	0.9646	1.0367	0.7197	2
59	0.6944	0.9651	1.0361	0.7195	1
60	0.6947	0.9657	1.0355	0.7193	0
	Cos	Cot	Tan	Sin	′

46°

,	Sin	Tan	Cot	Cos	
0	0.6947	0.9657	1.0355	0.7193	60
1	0.6949	0.9663	1.0349	0.7191	59
2	0.6951	0.9668	1.0343	0.7189	58
3	0.6953	0.9674	1.0337	0.7187	57
4	0.6955	0.9679	1.0331	0.7185	56
5	0.6957	0.9685	1.0325	0.7183	55
6	0.6959	0.9691	1.0319	0.7181	54
7	0.6961	0.9696	1.0313	0.7179	53
8	0.6963	0.9702	1.0307	0.7177	52
9	0.6965	0.9708	1.0301	0.7175	51
10	0.6967	0.9713	1.0295	0.7173	50
11	0.6970	0.9719	1.0289	0.7171	49
12	0.6972	0.9725	1.0283	0.7169	48
13	0.6974	0.9730	1.0277	0.7167	47
14	0.6976	0.9736	1.0271	0.7165	46
15	0.6978	0.9742	1.0265	0.7163	45
16	0.6980	0.9747	1.0259	0.7161	44
17	0.6982	0.9753	1.0253	0.7159	43
18	0.6984	0.9759	1.0247	0.7157	42
19	0.6986	0.9764	1.0241	0.7155	41
20	0.6988	0.9770	1.0235	0.7153	40
21	0.6990	0.9776	1.0230	0.7151	39
22	0.6992	0.9781	1.0224	0.7149	38
23	0.6995	0.9787	1.0218	0.7147	37
24	0.6997	0.9793	1.0212	0.7145	36
25	0.6999	0.9798	1.0206	0.7143	35
26	0.7001	0.9804	1.0200	0.7141	34
27	0.7003	0.9810	1.0194	0.7139	33
28	0.7005	0.9816	1.0188	0.7137	32
29	0.7007	0.9821	1.0182	0.7135	31
30	0.7009	0.9827	1.0176	0.7133	30
31	0.7011	0.9833	1.0170	0.7130	29
32	0.7013	0.9838	1.0164	0.7128	28
33	0.7015	0.9844	1.0158	0.7126	27
34	0.7017	0.9850	1.0152	0.7124	26
35	0.7019	0.9856	1.0147	0.7122	25
36	0.7022	0.9861	1.0141	0.7120	24
37	0.7024	0.9867	1.0135	0.7118	23
38	0.7026	0.9873	1.0129	0.7116	22
39	0.7028	0.9879	1.0123	0.7114	21
40	0.7030	0.9884	1.0117	0.7112	20
41	0.7032	0.9890	1.0111	0.7110	19
42	0.7034	0.9896	1.0105	0.7108	18
43	0.7036	0.9902	1.0099	0.7106	17
44	0.7038	0.9907	1.0094	0.7104	16
45	0.7040	0.9913	1.0088	0.7102	15
46	0.7042	0.9919	1.0082	0.7100	14
47	0.7044	0.9925	1.0076	0.7098	13
48	0.7046	0.9930	1.0070	0.7096	12
49	0.7048	0.9936	1.0064	0.7094	11
50	0.7050	0.9942	1.0058	0.7092	10
51	0.7053	0.9948	1.0052	0.7090	9
52	0.7055	0.9954	1.0047	0.7088	8
53	0.7057	0.9959	1.0041	0.7085	7
54	0.7059	0.9965	1.0035	0.7083	6
55	0.7061	0.9971	1.0029	0.7081	5
56	0.7063	0.9977	1.0023	0.7079	4
57	0.7065	0.9983	1.0017	0.7077	3
58	0.7067	0.9988	1.0012	0.7075	2
59	0.7069	0.9994	1.0006	0.7073	1
60	0.7071	1.0000	1.0000	0.7071	0
	Cos	Cot	Tan	Sin	,

TABLE IV

LOGARITHMS OF CONSTANTS

Log	π	= log 3.14159265	= 0.49715.
Log	π^2	= 2 log 3.14159265	= 0.99430.
Log	2π	= log 6.28318530	= 0.79818.
Log	$\sqrt{\pi}$	= ½ log 3.14159265	= 0.24857.
Log	C	= log 360°	= 2.55630.
Log	C	= log 21600′	= 4.33445.
Log	C	= log 1296000″	= 6.11261.
Log Radian		= log 57.29578°	= 1.75812.
Log	1°	= log .01745 radians	= 8.24188 − 10.

In the above, C = circumference of ⊙, π = ratio of circumference to diameter, Radian = arc whose length is that of the radius.

TABLE V

## SQUARES OF THE NATURAL NUMBERS

FROM 1 TO 1000

N.	0	1	2	3	4	5	6	7	8	9
10	10000	10201	10404	10609	10816	11025	11236	11449	11664	11881
11	12100	12321	12544	12769	12996	13225	13456	13689	13924	14161
12	14400	14641	14884	15129	15376	15625	15876	16129	16384	16641
13	16900	17161	17424	17689	17956	18225	18496	18769	19044	19321
14	19600	19881	20164	20449	20736	21025	21316	21609	21904	22201
15	22500	22801	23104	23409	23716	24025	24336	24649	24964	25281
16	25600	25921	26244	26569	26896	27225	27556	27889	28224	28561
17	28900	29241	29584	29929	30276	30625	30976	31329	31684	32041
18	32400	32761	33124	33489	33856	34225	34596	34969	35344	35721
19	36100	36481	36864	37249	37636	38025	38416	38809	39204	39601
20	40000	40401	40804	41209	41616	42025	42436	42849	43264	43681
21	44100	44521	44944	45369	45796	46225	46656	47089	47524	47961
22	48400	48841	49284	49729	50176	50625	51076	51529	51984	52441
23	52900	53361	53824	54289	54756	55225	55696	56169	56644	57121
24	57600	58081	58564	59049	59536	60025	60516	61009	61504	62001
25	62500	63001	63504	64009	64516	65025	65536	66049	66564	67081
26	67600	68121	68644	69169	69696	70225	70756	71289	71824	72361
27	72900	73441	73984	74529	75076	75625	76176	76729	77284	77841
28	78400	78961	79524	80089	80656	81225	81796	82369	82944	83521
29	84100	84681	85264	85849	86436	87025	87616	88209	88804	89401
30	90000	90601	91204	91809	92416	93025	93636	94249	94864	95481
31	96100	96721	97344	97969	98596	99225	99856	100489	101124	101761
32	102400	103041	103684	104329	104976	105625	106276	106929	107584	108241
33	108900	109561	110224	110889	111556	112225	112896	113569	114244	114921
34	115600	116281	116964	117649	118336	119025	119716	120409	121104	121801
35	122500	123201	123904	124609	125316	126025	126736	127449	128164	128881
36	129600	130321	131044	131769	132496	133225	133956	134689	135424	136161
37	136900	137641	138384	139129	139876	140625	141376	142129	142884	143641
38	144400	145161	145924	146689	147456	148225	148996	149769	150544	151321
39	152100	152881	153664	154449	155236	156025	156816	157609	158404	159201
40	160000	160801	161604	162409	163216	164025	164836	165649	166464	167281
41	168100	168921	169744	170569	171396	172225	173056	173889	174724	175561
42	176400	177241	178084	178929	179776	180625	181476	182329	183184	184041
43	184900	185761	186624	187489	188356	189225	190096	190969	191844	192721
44	193600	194481	195364	196249	197136	198025	198916	199809	200704	201601
45	202500	203401	204304	205209	206116	207025	207936	208849	209764	210681
46	211600	212521	213444	214369	215296	216225	217156	218089	219024	219961
47	220900	221841	222784	223729	224676	225625	226576	227529	228484	229441
48	230400	231361	232324	233289	234256	235225	236196	237169	238144	239121
49	240100	241081	242064	243049	244036	245025	246016	247009	248004	249001
50	250000	251001	252004	253009	254016	255025	256036	257049	258064	259081
N.	0	1	2	3	4	5	6	7	8	9

N.	0	1	2	3	4	5	6	7	8	9
50	250000	251001	252004	253009	254016	255025	256036	257049	258064	259081
51	260100	261121	262144	263169	264196	265225	266256	267289	268324	269361
52	270400	271441	272484	273529	274576	275625	276676	277729	278784	279841
53	280900	281961	283024	284089	285156	286225	287296	288369	289444	290521
54	291600	292681	293764	294849	295936	297025	298116	299209	300304	301401
55	302500	303601	304704	305809	306916	308025	309136	310249	311364	312481
56	313600	314721	315844	316969	318096	319225	320356	321489	322624	323761
57	324900	326041	327184	328329	329476	330625	331776	332929	334084	335241
58	336400	337561	338724	339889	341056	342225	343396	344569	345744	346921
59	348100	349281	350464	351649	352836	354025	355216	356409	357604	358801
60	360000	361201	362404	363609	364816	366025	367236	368449	369664	370881
61	372100	373321	374544	375769	376996	378225	379456	380689	381924	383161
62	384400	385641	386884	388129	389376	390625	391876	393129	394384	395641
63	396900	398161	399424	400689	401956	403225	404496	405769	407044	408321
64	409600	410881	412164	413449	414736	416025	417316	418609	419904	421201
65	422500	423801	425104	426409	427716	429025	430336	431649	432964	434281
66	435600	436921	438244	439569	440896	442225	443556	444889	446224	447561
67	448900	450241	451584	452929	454276	455625	456976	458329	459684	461041
68	462400	463761	465124	466489	467856	469225	470596	471969	473344	474721
69	476100	477481	478864	480249	481636	483025	484416	485809	487204	488601
70	490000	491401	492804	494209	495616	497025	498436	499849	501264	502681
71	504100	505521	506944	508369	509796	511225	512656	514089	515524	516961
72	518400	519841	521284	522729	524176	525625	527076	528529	529984	531441
73	532900	534361	535824	537289	538756	540225	541696	543169	544644	546121
74	547600	549081	550564	552049	553536	555025	556516	558009	559504	561001
75	562500	564001	565504	567009	568516	570025	571536	573049	574564	576081
76	577600	579121	580644	582169	583696	585225	586756	588289	589824	591361
77	592900	594441	595984	597529	599076	600625	602176	603729	605284	606841
78	608400	609961	611524	613089	614656	616225	617796	619369	620944	622521
79	624100	625681	627264	628849	630436	632025	633616	635209	636804	638401
80	640000	641601	643204	644809	646416	648025	649636	651249	652864	654481
81	656100	657721	659344	660969	662596	664225	665856	667489	669124	670761
82	672400	674041	675684	677329	678976	680625	682276	683929	685584	687241
83	688900	690561	692224	693889	695556	697225	698896	700569	702244	703921
84	705600	707281	708964	710649	712336	714025	715716	717409	719104	720801
85	722500	724201	725904	727609	729316	731025	732736	734449	736164	737881
86	739600	741321	743044	744769	746496	748225	749956	751689	753424	755161
87	756900	758641	760384	762129	763876	765625	767376	769129	770884	772641
88	774400	776161	777924	779689	781456	783225	784996	786769	788544	790321
89	792100	793881	795664	797449	799236	801025	802816	804609	806404	808201
90	810000	811801	813604	815409	817216	819025	820836	822649	824464	826281
91	828100	829921	831744	833569	835396	837225	839056	840889	842724	844561
92	846400	848241	850084	851929	853776	855625	857476	859329	861184	863041
93	864900	866761	868624	870489	872356	874225	876096	877969	879844	881721
94	883600	885481	887364	889249	891136	893025	894916	896809	898704	900601
95	902500	904401	906304	908209	910116	912025	913936	915849	917764	919681
96	921600	923521	925444	927369	929296	931225	933156	935089	937024	938961
97	940900	942841	944784	946729	948676	950625	952576	954529	956484	958441
98	960400	962361	964324	966289	968256	970225	972196	974169	976144	978121
99	980100	982081	984064	986049	988036	990025	992016	994009	996004	998001
N.	0	1	2	3	4	5	6	7	8	9
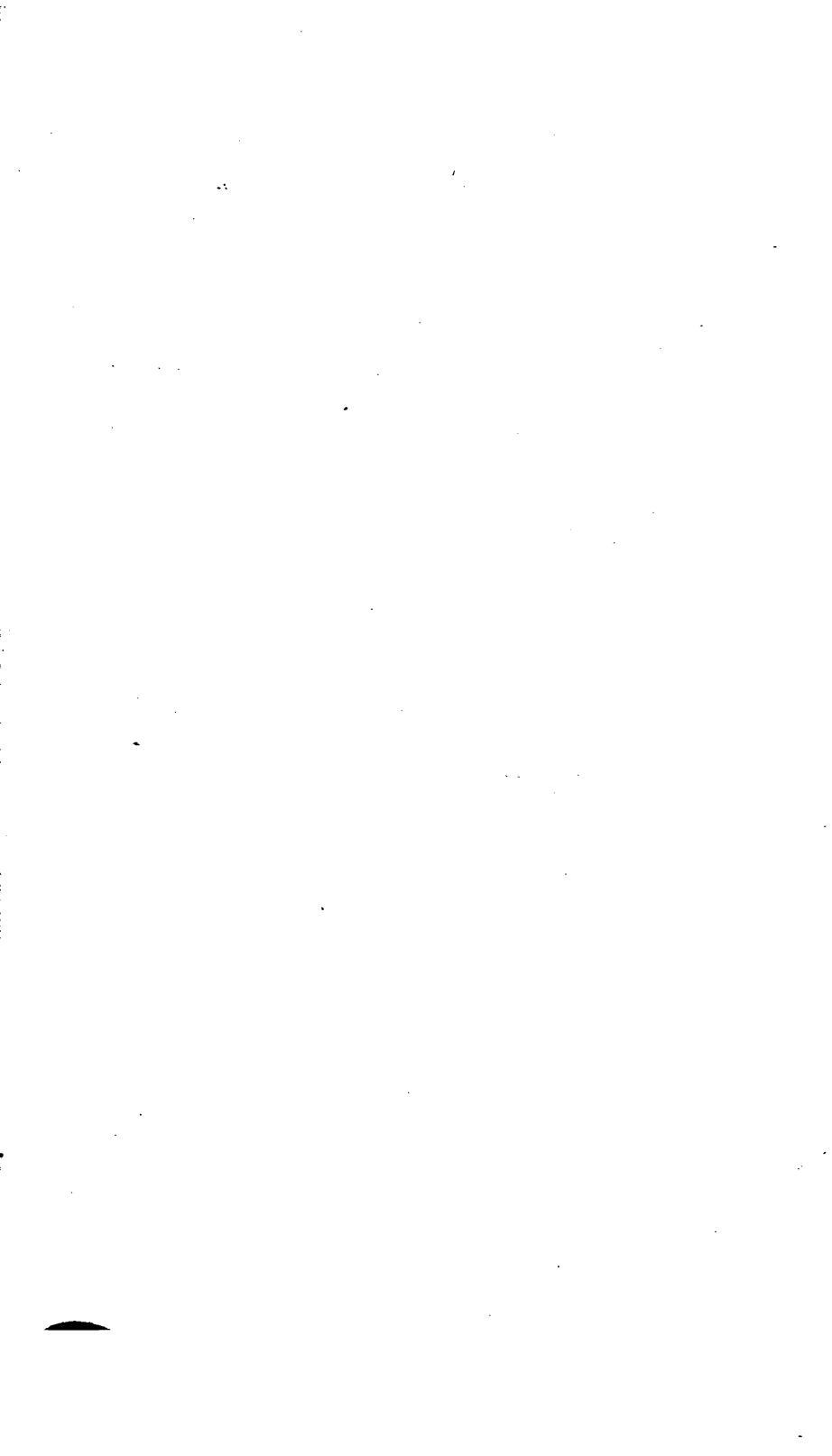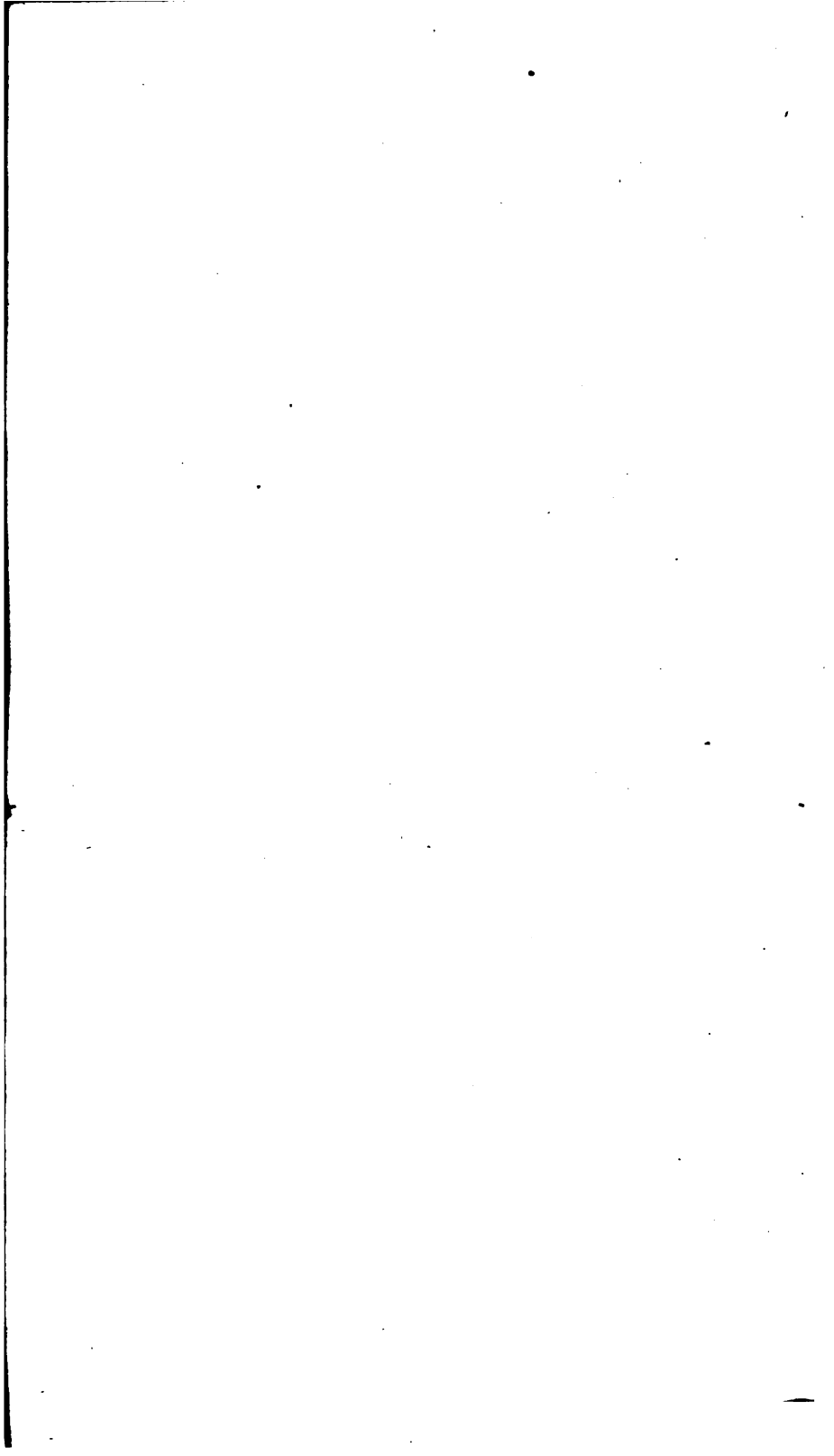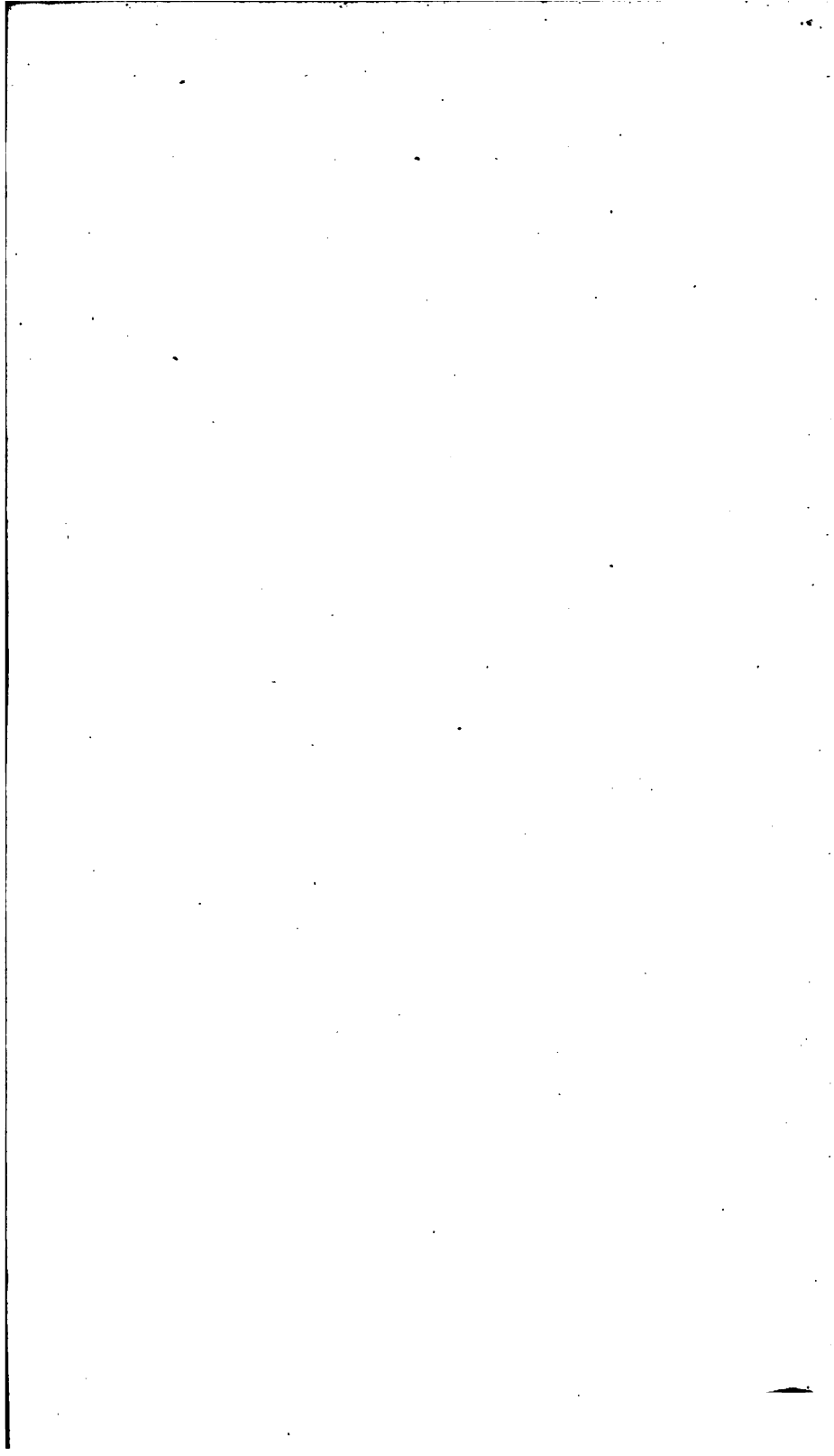
$$V = V_0 + gt$$
$$S = V_0 t + \frac{1}{2} g t^2$$
$$V = gt$$
$$S = \frac{1}{2} g t^2 \qquad t = \sqrt{\frac{2S}{g}}$$
$$V = \sqrt{2gS}$$

$$E = \frac{1}{2} m v^2$$
$$C.T = \frac{m v^2}{r}$$

Bright $\qquad \dfrac{2 v}{4}$

$\qquad\qquad \dfrac{v}{2} \qquad\qquad d = \dfrac{r^2}{2R}$